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CONTENTS

Report on Applications for Matriculation in Seventy-eight Schools of Medicine of the United States for the Freshman Class of 1932. <i>Fred C. Zapffe</i>	65
Some Aspects of Human Anatomy. <i>J. Parsons Schaeffer</i>	79
The Foreign Medical Graduate. <i>Harold Rypins</i>	92
The Basic Principles of Education and Instruction in Roentgenology. <i>William H. Meyer</i>	97
Meetings of Association of American Medical Colleges	110
Editorials	111
College News	114
Personals	119
Abstracts of Current Literature	120

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Continued on Third Cover Page

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JOURNAL
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**Report on Applications for Matriculation in
Seventy-eight Schools of Medicine of the United States
for the Freshman Class of 1932***

FRED C. ZAPFFE

Secretary Association of American Medical Colleges
Chicago, Illinois

In 1926, the Commission on Medical Education consented to defray the cost of making a study of applicants seeking admission to the medical schools of the United States and Canada. Dr. B. D. Myers, dean at Bloomington of Indiana University School of Medicine, agreed to undertake this task. The study was continued for four consecutive years when lack of further financial support made it impossible to carry on further.

The demands for a resumption of the study were so numerous, that at the annual meeting of the Association of American Medical Colleges, held in New Orleans in 1931, it was voted to revive the work with the entering class of 1932. Herewith is presented the report on that study.

Owing to the fact that many of the Canadian medical schools did not cooperate in the study in previous years, and that most of them were found not to have any students from the United States, these schools are not included in the present report.

The card used in 1932 was essentially the same as the one used in the previous studies. The one point of difference was that in 1932 the question was asked as to premedical preparation, which was not asked in the previous studies. The reason for this question was to answer repeated inquiries and statements to the effect that there was some discrimination against applicants who presented less than four years of college work. This view probably arose from the fact that schools publishing a minimum of two or even three years of college work for admission actually do not accept any applicant who does not have a baccalaureate or other degree.

A notable feature of the first four studies was the steady increase, year by year, of applicants and applications. Of course, the years from

*Presented at the Forty-third Annual Meeting of the Association of American Medical Colleges held in Philadelphia, Nov. 14-16, 1932.

1926 to 1929 inclusive were extremely prosperous years, whereas the year 1932 was very much the other way, yet there was only about a 10 per cent falling off in the number of applicants and a slight increase in the number of applications as the following summary of all the years that the study was made shows:

	1926-27	1927-28	1928-29	1929-30	1932
Number of applications.....	20,093	23,595	28,998	31,749 ¹	31,429
Number of applicants.....	10,006	11,287	12,420	13,655	12,280
No. applicants accepted	6,420	6,496	6,974	7,035	7,357
No. applicants refused	3,586	4,523	5,446	6,620	4,923

Of the 7,035 applicants² accepted in 1929, only 6,359 matriculated and began the study of medicine. Of the 7,357 applicants accepted in 1932, only 6,335 matriculated (including 184 repeaters).

Fewer repeaters applied in 1932 than in 1929—188 as against 263. More "first time" applications were accepted this year than in 1929—8,816 as against 7,089. More applications were refused this year because of "class full" than in 1929—8,229 as against 7,396. The "inadequate credentials" group shows a considerable falling off this year—1,934 as against 2,587 in 1929.

In Table I is presented a summary of the whole study.

TABLE 1. SUMMARY OF TOTALS OF APPLICANTS AND APPLICATIONS

Total Number of Applicants.....	12,280	
Total Number of Applications.....	31,429	
Total Number of Single Applicants.....	7,246	
Total Number of Accepted.....	4,268	58.9%
Total Number of Multiple Applicants.....	5,034	
Total Number of Applications.....	24,163	
Total Number of Multiple Applicants Accepted.....	3,089	61%
Total Number of Applicants Accepted.....	7,357	59.9%
Total Number of Applicants Refused.....	4,923	

It is noteworthy that a greater percentage of multiple applicants than single applicants were accepted, 61 per cent as against 58.9 per cent. However, not a few of the multiples who made only two or three applications were holders of bachelor's degrees and were accepted by each school to which they applied. This may also have been the case in the previous studies. The data which would show this are not at hand.

Table 2 presents the data in detail for each one of the 78 medical schools which cooperated in this study. By way of comparison, the figures obtained by Dr. Myers in the 1929-1930 study are also given. The table includes both male and female applicants. The figures in each case represent the total number of applicants for each school, but many of these applied to more than one school. The itemized data on single and multiple applicants are given elsewhere.

1. This figure includes 681 applications made to Canadian Medical Schools.

2. Of this number, 405 were accepted by Canadian schools.

TABLE 2. TOTALS BY COLLEGES (78) OF APPLICATIONS MADE AND DISPOSITION
(MEN AND WOMEN)

SCHOOL	I.				II.		III.		Misc.	TOTALS
	1	2	3	4	1	2	1	2		
Alabama	94	2	4	329	35	6				470
(1929-30)	83	7	4	258	23	6	43	2		426
Arkansas	63		14	9	6		2			94
(1929-30)	54	7	7	5	18		2			93
Med. Evang.	144	4	50	9	22		14			243
(1929-30)	133	11	23	11	18					196
Stanford	73		64		32		2			171
(1929-30)	55		27	53	15	1	6	1		158
California	92		14	52	37	3			26	224
(1929-30)	75		9	49	34		6			173
So. California	77		6	59	44	1	3	2		192
(1929-30)	65	3	16	17	92		12	4		209
Colorado	64	2	9	27	8		2	9	5	126
(1929-30)	65	5		26	8	10	35	16		165
Yale	153		146	188	3		38			528
(1929-30)	50		21	349			9			429
Georgetown	221		34	440	41	46	12	1		795
(1929-30)	129	2	24	163		7	107			432
Geo. Washington ..	117		2	252	20	3				394
(1929-30)	102	2	38	97	18	28	1			286
Howard	86	1	60	6	4	21	6	13	20	217
(1929-30)	94		59	1	1	87	21	23		286
Emory	75	5	35	78	3	2	6		32	236
(1929-30)	75	4		207	2	3	15			306
Georgia	41	1	48	19					1	110
(1929-30)	37		91	8		1	30	8		175
Loyola	190	10	12	231	29					472
(1929-30)	202	3	99	300	10	9	35			658
Chicago U.	156		220	58	1	1				436
(1929-30)	159		242	71						472
Illinois	224		58	64	110		7			463
(1929-30)	221	1	212	7	43	1				485
Northwestern	193		216	71	65		383	3		931
(1929-30)	166		673	169	28		307	3		1346
Chicago M. Sch. ..	107	12	5	1	25		3			153
(1929-30)	70	12			19	1	8	1		111
Indiana	135		50	103	10	12	7	11		328
(1929-30)	128	1	20	228	43	6	69	5		500
Iowa	130			27	4	16	2			179
(1929-30)	160	5	8	3	7	11	2			196
Kansas	82		57	29	11	13	72			264
(1929-30)	80	5	75	16	20	17	36	2		251
Louisville	148	8	378	58	8	3				603
(1929-30)	35	1	38	137	12	31	11	2		267
Tulane	227	8	42	27	28	70	92	39		533
(1929-30)	140	14	62	21	55	48	248	87		675
Louisiana St.	99	9	8	88	20	5	1			230

TOTALS	SCHOOL	I.				II.		III.		Misc.	TOTALS
		1	2	3	4	1	2	1	2		
265	Duke	118		68	413	3					602
200	N. Carolina	34		3	9	35	1				82
934	(1929-30)	48	2	14	7	22	6	85	3		187
860	Wake Forest.....	37		3		1		3			44
283	North Dakota.....	39	2	5		9	4	102			161
690	(1929-30)	34			5	11		224	2		276
692	Ohio State U.....	111		109	59	2				10	291
618	(1929-30)	88	7	40	67	28	1	5	5		241
811	Eclectic Med.....	54		6	31	4	10	1			106
869	Cincinnati	84	11	64	52	16		4		29	260
153	(1929-30)	111	2	72	54	58	3	1			301
150	Western Reserve	116		29	199	28	2	231	2		607
570	(1929-30)	35		146	354	11	3	21	3		623
573	Oklahoma	81	4	34	48	3	2	3	1		176
277	(1929-30)	80	4	68	70	5	2	8	1		238
335	Oregon	77	3	102	36	32	3	43	2		298
171	(1929-30)	84	1	105	20	18	2	1			231
225	Hahnemann	291	5	423	20	13	1				753
1136	(1929-30)	142	32	63	3		5	225	146		616
904	Jefferson	222		194	181	20	4	70	4		695
70	(1929-30)	205		121	376	198		117			1017
81	Temple	149		484	264	27	2	104	11		1041
443	(1929-30)	117		4	540	22	2				685
526	Pennsylvania	183		682	13	48	5	50	1	1	983
244	(1929-30)	128		848	3	85	8	16	12		1100
421	Pittsburgh	77		285		8		25			395
224	(1929-30)	73		185	42	18		19			337
232	Woman's Med.....	64	6		3	9		13			95
147	(1929-30)	39	3	1	5	24					72
130	South Carolina....	36	4	86	35	1	38	57	41		298
434	(1929-30)	39	2	217	1		54	89	17		419
414	South Dakota	40	3	4	31		8	4			90
891	(1929-30)	29	1	56	26	2	19	1	1		135
663	Meharry	51	6		8	35					100
663	(1929-30)	64	6	35	5		1	2			113
91	Tennessee	147	3	13	26	2					191
659	(1929-30)	133	15	37	50	17		2	4		258
1176	Vanderbilt	72		44	241	17	1	47		1	423
1024	(1929-30)	69		75	272	9	2	18			445
958	Baylor	121	3	14	31	7		1			177
730	(1929-30)	111	16	25	23	1	18	4			198
612	Texas	100		25		4					129
536	(1929-30)	106		10	36	9	7				168
782	Utah	36		18	6	22	7				89
816	(1929-30)	30		10	6	17	1		7		71
1051	Vermont	48	2	8	14	4		42			118
999	(1929-30)	50	4	10			1	1	1		67
230	Med. Coll. Va.....	107	8	127	68		13	18			341
44	(1929-30)	104	3	236	51		4	19			417

SCHOOL.	I.				II.		III.		Misc.	TOTALS
	1	2	3	4	1	2	1	2		
U. Virginia	70		37	115	18	21				261
(1929-30)	66	2	109	45	2	49	17	35		325
West Virginia	71	9	92	3	14	1	154	8		352
(1929-30)	65		109	13	8	2	157	7		361
Wisconsin	129		40	44	4	5				222
(1929-30)	109	5	36	28	15					193
Marquette	128		183	25	12	1				349
(1929-30)	80	5	209	41	27	3	269	46		680
(1932-33)	8816	188	8229	7899	1476	458	3737	308	318	31429
(1929-30)	7089	263	7396	8256	2007	579	4519	654	5	30768

No conclusions can be drawn from these figures, although many views may be held as to the reason for fewer applications in the case of one school and a greater number in the case of another school. In some instances these variations are considerable; in others very small. Perhaps, schools are less prone not to report "inquiries" for information as applications, now that the purpose of this study is understood better because of the previous studies. One reason for fewer applications may be that the admission requirements were increased. A desire to reduce the cost of living may have actuated many students to apply for admission to a college nearer home, or one situated in their home town. It certainly could not have been due to the fact that applicants with less than four years of college work applied to the colleges with entrance requirements at or near the minimum because 60.4 per cent of the total number of applications were made by four year men (Table 6).

Table 3 presents the figures on the women applicants. The correctness of the number of women applicants cannot be vouched for inasmuch as only those applicants could be counted as women whose names definitely indicated them to be of that sex. Some schools did not seem to have any female applicants so far as the names on the cards would indicate. Perhaps, that is correct as all medical schools do not accept women students. However, the number of applications for 1932 was 999 as against 801 for 1929.

In 1929, 68.4 per cent of applications made by women were accepted; whereas in 1932 only 47.9 per cent were accepted.

The multiple applicant presents a distinct problem. In 1929, Dr. Myers reported on 2,271 multiple applicants. In 1932 this number had increased to 5,034!

The determination of the multiple applicants was made with the greatest possible care. Names and addresses were checked more than

TABLE 3. TOTALS BY COLLEGES OF APPLICATIONS MADE BY WOMEN

SCHOOL	I.				II.		III.		Misc.	TOTALS
	1	2	3	4	1	2	1	2		
Alabama	3				1					4
Arkansas	3									3
Med. Evangelists..	17		5				1			23
Stanford	1		10		1					12
California	14		3	2	2				2	23
S. California	5			5	4					14
Colorado	7						1			8
Yale	10		6	5			1			22
Georgetown										0
Geo. Washington..	7			2						9
Howard	3		2					1	3	9
Emory										0
Georgia	4									4
Loyola	13			3	1					17
Chicago U.	12		13	1						26
Illinois	18		2							20
Northwestern	9		16	1	1		7			34
Chicago M. Sch....	2									2
Indiana	4			4	2		1			11
Iowa	5					2				7
Kansas	5					1				6
Louisville	4	2	3	1						10
Tulane	4	1				1	1	2		9
Louisiana State...	3	1		1						5
Johns Hopkins....	10		2	1	7				5	25
Maryland	3		2	2	1		1		3	12
Boston	11		1	2						14
Harvard										0
Tufts	10			4			3			17
Detroit	4									4
Michigan	13		7	1			1		1	23
Minnesota	6		2		2		2			12
Mississippi				1						1
St. Louis U.										0
Missouri	2									2
Washington U.	8		1	2	1					12
Creighton	3						1			4
Nebraska	4									4
Albany	3		2		1					6
Columbia	16	1	27	9	2					55
Cornell-N. Y.	9		3	30			1			43
Cornell-Ithaca	2		3	1						6
Long Island.....	9	1	1	3	1	2	17			34
N. Y. Homeo.....	6		12	7						25
Syracuse	2			5			1		2	10
Univ. & Bellevue..	9		9	11	1					30
Buffalo	7		3	2			6	4		22

SCHOOL	I.				II.		III.		Misc.	TOTALS
	1	2	3	4	1	2	1	2		
Rochester	7			5						12
Duke	2		2	7	1				3	15
North Carolina.....	2			1	2					5
Wake Forest			1							1
North Dakota.....			7	1						8
Eclectic Med.....										0
Cincinnati	4		4	2	2					12
Western Reserve..	6		2	9			6			23
Oklahoma	5		1							6
Oregon	9		5	2	1					17
Hahnemann	2									2
Jefferson										0
Temple	7		6		3		1			17
Pennsylvania	7		21		4	1	2			35
Pittsburgh	4		8		1					13
Woman's Med.....	64	6		3	9		13			95
South Carolina.....		1	4	1		2	2	1		11
South Dakota	1			1						2
Meharry	1				3					4
Tennessee	4									4
Vanderbilt	9			6	3			1		19
Baylor	4									4
Texas	9	1	2			1				13
Utah	4									4
Vermont	1									1
Med. College Va... 5			1	3						9
Virginia	2		1		1	2				6
West Virginia.....	5	1								6
Wisconsin	10		4		2					16
Marquette										
							Women not marked			
Grand Totals.....	464	15	204	147	60	12	69	9	19	999
	47.9%			20.2%						

once, but, no doubt, some of the multiple applicants were missed in the final count because it was not an unusual finding that an applicant with a somewhat unusual name, one which easily identified itself, would apply from more than one address. The feeling was that it was one and the same person, but the addresses left the determination in doubt; hence, this was counted as a single application. A man would apply to, say, the University of Michigan from a Brooklyn address. Exactly the same name (not initials, but the name in full) would appear with an Ann Arbor address applying to a school in Chicago. Again the same name with a Chicago address would apply to a New York school, and so on indefinitely sometimes.

However, every effort was made to place these applications in the

TABLE 4. DETAILS ON 5,034 MULTIPLE APPLICANTS

1709 made 2 applications=3418 653 had no acceptances. 1056 had 1391 acceptances. 1 acceptance—721 2 acceptances—335	934 made 3 applications=2802 330 had no acceptances. 604 had 967 acceptances. 1 acceptance—324 2 acceptances—197 3 acceptances—83
649 made 4 applications=2596 224 had no acceptances. 425 had 728 acceptances. 1 acceptance—220 2 acceptances—130 3 acceptances—52 4 acceptances—23	403 made 5 applications=2015 141 had no acceptances. 262 had 455 acceptances. 1 acceptance—139 2 acceptances—74 3 acceptances—33 4 acceptances—11 5 acceptances—5
320 made 6 applications=1920 132 had no acceptances. 188 had 365 acceptances. 1 acceptance—90 2 acceptances—55 3 acceptances—20 4 acceptances—13 5 acceptances—7 6 acceptances—3	222 made 7 applications=1554 91 had no acceptances. 131 had 244 acceptances. 1 acceptance—68 2 acceptances—36 3 acceptances—13 4 acceptances—8 5 acceptances—4 6 acceptances—1 7 acceptances—1
156 made 8 applications=1248 65 had no acceptances. 91 had 146 acceptances. 1 acceptance—61 2 acceptances—15 3 acceptances—9 4 acceptances—4 6 acceptances—2	123 made 9 applications=1107 56 had no acceptances. 67 had 119 acceptances. 1 acceptance—38 2 acceptances—17 3 acceptances—8 5 acceptances—3 8 acceptances—1
102 made 10 applications=1020 53 had no acceptances. 49 had 89 acceptances. 1 acceptance—30 2 acceptances—9 3 acceptances—3 4 acceptances—5 5 acceptances—1 7 acceptances—1	75 made 11 applications=825 36 had no acceptances. 39 had 73 acceptances. 1 acceptance—22 2 acceptances—11 3 acceptances—1 4 acceptances—1 5 acceptances—2 6 acceptances—2
66 made 12 applications=792 31 had no acceptances. 35 had 70 acceptances. 1 acceptance—20 2 acceptances—6 3 acceptances—4 4 acceptances—2 5 acceptances—2 8 acceptances—1	34 made 13 applications=442 16 had no acceptances. 18 had 30 acceptances. 1 acceptance—11 2 acceptances—4 3 acceptances—1 4 acceptances—2

TABLE 4—Continued.

48 made 14 applications=672	55 made 15 applications=825
28 had no acceptances.	31 had no acceptances.
20 had 35 acceptances.	24 had 40 acceptances.
1 acceptance—13	1 acceptance—16
2 acceptances—5	2 acceptances—5
5 acceptances—1	3 acceptances—1
7 acceptances—1	4 acceptances—1
	7 acceptances—1
30 made 16 applications=480	27 made 17 applications=459
11 had no acceptances.	15 had no acceptances.
19 had 32 acceptances.	12 had 14 acceptances.
1 acceptance—14	1 acceptance—10
2 acceptances—3	2 acceptances—2
4 acceptances—1	
8 acceptances—1	
19 made 18 applications=342	16 made 19 applications=304
9 had no acceptances.	7 had no acceptances.
10 had 19 acceptances.	9 had 16 acceptances.
1 acceptance—3	1 acceptance—4
2 acceptances—6	2 acceptances—4
4 acceptances—1	4 acceptances—1
10 made 20 applications=200	8 made 21 applications=168
6 had no acceptances.	3 had no acceptances.
4 had 1 acceptance.	5 had 7 acceptances.
1 acceptance—4	1 acceptance—3
	2 acceptances—2
9 made 22 applications=198	8 made 23 applications=184
2 had no acceptances.	3 had no acceptances.
7 had 12 acceptances.	5 had 16 acceptances.
1 acceptance—4	1 acceptance—2
2 acceptances—1	4 acceptances—1
3 acceptances—2	5 acceptances—2
5 made 24 applications=120	3 made 25 applications=75
4 had no acceptances.	2 had no acceptances.
1 had 1 acceptance.	1 had 1 acceptance.
3 made 26 applications=78	1 made 27 applications=27
2 had no acceptances.	No acceptances.
1 had 2 acceptances.	
1 made 28 applications=28	3 made 29 applications=87
No acceptances.	1 had no acceptances.
	2 had 1 acceptance each
1 made 30 applications=30	1 made 31 applications=31
No acceptances.	1 acceptance.
1 made 32 applications=32	1 made 34 applications=34
1 acceptance.	2 acceptances.
1 made 35 applications=35	
5 acceptances.	

proper category, and the result is this tremendously large number of multiple applicants and applications.

Table 4 gives the details on these multiple applicants.

Of the total number of 14,163 multiple applications, 38.8 per cent were not accepted as against 41.1 per cent of the single applications—and 61 per cent of the multiple applicants were accepted as against 58.9 per cent of the single applicants. Review of the cards shows that not a few of the multiple applicants applied to four, five, six, seven and eight medical schools and were accepted by each one, which accounts for increased percentages in favor of multiple applicants. On the whole, the multiple applicants did not fare as well as did the single applicants.

TABLE 5. SUMMARY OF ACCEPTANCES AND REJECTIONS ACCORDING TO LENGTH OF PREMEDICAL PREPARATION

I.	2 yrs.	2+ yrs.	3 yrs.	3+ yrs.	4 yrs.	4+ yrs.	5 yrs.	5+ yrs.	6 yrs.	6+ yrs.	7 yrs.	7+ yrs.	8 yrs.	9 yrs.	Not stated
1.	825	631	1839	611	3966	349	263	42	60	21	15	5	3		1
2.	16	21	27	15	83	10	10	3	3						
3.	273	224	1268	616	4733	503	236	61	60	8	1	2	4		14
4.	330	267	1329	1018	4154	326	290	72	54	9	11			1	23
II.															
1.	186	128	344	66	537	45	46	4	17	7					18
2.	84	43	90	52	119	18	17	5	3	1	1				2
III.															
1.	127	51	672	172	2437	16	103	3	12		3				47
2.	79	12	40	5	216	3	11		3						51

In Table 5 is presented the summary of the data on acceptances and rejections as affected by the length of premedical preparation. Of the total number of applications made by students with from 2 to 3 years of preparation, 45.3 per cent were rejected; of the 3 to 4 year students' applications, 30.5 per cent were rejected; of the 4 or more years students' applications 25.5 per cent were rejected. In other words, the number of rejections decreased notably with better preparation—or, at least, longer preparation. The difference between the 2 and the 4 year group was 20.2 per cent.

However, when one reviews the reasons for rejection in each group, the picture varies somewhat. Rejections for poor scholarship or personality and inadequate credentials in the 2 to 3 year group were 30 per cent; in the 3 to 4 year group, 51 per cent; in the 4 or more years group, 40.5 per cent.

Other interesting findings were made. They are presented in detail in Table 6.

Only 10.4 per cent of the total number of applications were made by the 2 to 3 year students; 25.9 per cent by the 3 to 4 year group and 60.4 per cent by the 4 or more years group. It is evident, therefore, that the tendency is for students to secure a better preparation before entering on the study of medicine than is called for by the minimum requirements for admission to medical schools. In another study on student accomplishment, also reported on at the 1932 meeting of the Association, the figures on this aspect of premedical preparation were given. This study will be published in the JOURNAL later.

TABLE 6. SUMMARY OF DATA ON DISPOSITION OF APPLICATIONS WITH REFERENCE TO PREMEDICAL PREPARATION*

Applications made by the 2 and 2+ year men:

Applications, 3297=10.4% of total applications.

Accepted, 1493=45.3% of the 2 to 3 year applications.

Rejected, 1804=54.7% of the 2 to 3 year applications.

Class full, 497.

Poor scholarship and personality, 597 } 1038=30% of rejections

Inadequate credentials, 441 } in this group.

Credentials not seen or examined, 269.

Applications made by the 3 and 3+ years men:

Applications, 8158=25.9% of total applications.

Accepted, 2492=30.5% of the 3 to 4 year applications.

Rejected, 5672=69.5% of the 3 to 4 year applications.

Class full, 1884.

Poor scholarship and personality, 2347 } 2899=51% of rejections

Inadequate credentials, 552 } in this group.

Credentials not seen or examined, 889.

Applications made by the 4 or more year men:

Applications, 18,985=60.4% of total applications.

Accepted, 4833=25.5% of the 4 or more year applications.

Rejected, 14,152=74.6% of the 4 or more year applications.

Class full, 5608.

Poor scholarship and personality, 4917 } 5737=40.5% of rejections

Inadequate credentials, 820 } in this group.

Credentials not seen or examined, 2807.

Another interesting phase of this problem was the geographical distribution of the multiple applicants. The figures are shown in Table 7.

Nine states, New York, Pennsylvania, Ohio, New Jersey, Massachusetts, Illinois, California, Connecticut, and Michigan contributed 3,760 of the total number of multiple applicants—or 74.6 per cent. New York state contributed 28.8 per cent of the total and most of these applicants lived in New York City. Very few of them came from other cities or towns in the state. More than one-half of the total number

*One hundred and eleven (111=3.3%) applications made by students with less than two years of premedical work are not included in this table.

came from New York and Pennsylvania—2,152. As stated previously, these figures may be questioned as it was not always possible to state positively whence the applicant came as exactly the same names, as, say, Montmorency Algernon Smitherson (there was no such name, but it may be accepted for purpose of illustration), were found on several cards, each giving a different place of residence. It is quite probable that the bearer of such a distinctive name changed his address of appli-

TABLE 7. GEOGRAPHICAL DISTRIBUTION OF THE 5,034 MULTIPLE APPLICANTS.

New York	1453	Hawaii	23
Pennsylvania	702	Tennessee	20
Ohio	326	Mississippi	20
New Jersey	325	New Hampshire	19
Massachusetts	249	Maine	18
Illinois	234	Utah	18
California	225	Arkansas	13
Connecticut	141	Arizona	13
Michigan	105	Montana	12
Wisconsin	63	Porto Rico	12
Indiana	62	Vermont	11
Missouri	62	Idaho	11
Texas	56	South Dakota	10
Washington	51	Delaware	10
Rhode Island	50	South Carolina	10
North Carolina	48	New Mexico	7
Kentucky	47	Colorado	6
Georgia	43	Canada	5
Oklahoma	42	North Dakota	4
Kansas	39	Panama	3
Maryland	37	Philippine Islands	2
Nebraska	36	Jamaica, B. W. I.	2
Virginia	35	Wyoming	1
West Virginia	34	Nevada	1
Alabama	33	Alaska	1
Florida	32	Mexico	1
Minnesota	32	China	1
Iowa	30	India	1
Washington, D. C.	30	Colombia, S. A.	1
Oregon	29	Havana, Cuba	1
Louisiana	25	Japan	1

cation for a definite purpose. It is hardly possible that more than one applicant would bear that name or one as distinctive. However, when such an incidence occurred, the cards were kept separate and another multiple applicant was counted. In the long run, however, the instances of this kind were comparatively infrequent and would not alter the total count appreciably. The percentages would be affected hardly at all.

Every state in the Union is represented in this list; also the territory of Alaska, Hawaii, the Philippines, Porto Rico and nine foreign countries. On the basis of population of the states it would seem that some

of them show a disproportionate number of applicants, especially when the single applicants are added to the list of multiple applicants.

It is evident that more applicants are accepted by the various schools than eventually matriculate. No doubt this is due to the fact that the several schools, in the main, wish to make certain that they will have the quota they need for the freshman class because some applications are withdrawn and, as stated, not all the accepted applicants matriculate. Why this is so is not in each case evident in this study. Some applications probably are withdrawn because the applicant has been accepted by the school of choice; some seem to have decided not to study medicine. Direct inquiry made to each nonmatriculant is the only way of answering this question. It would mean sending out about 1,000 letters, no small task in itself.

It is not possible at this time to state what was the ultimate fate of the rejected students as that, too, would necessitate writing nearly 5,000 letters. If this study had been made last year, a check could be made with this year's cards to see whether the rejected ones applied again.

More than one quarter, 26.1 per cent, of the total number of applications were rejected because of "class full." A considerable number of these rejections were in the group of the multiple applicants. It is not possible to state whether any of these applicants would have been accepted if the class had not been filled; however, the fact that so many applicants showed rejections for other reasons would lead one to assume that, after all, this group of "class full" rejections would have been reduced considerably on the side of rejection for other reasons, such as poor personality or poor scholarship, had definite action been taken on these applications.

On the whole, there does not appear to be any likelihood that medical schools are facing a shortage in students, nor that the supply of physicians will be insufficient in quantity to meet the needs of the country, despite the fact that for many years the number graduated is about 25 per cent fewer than the number that matriculated four or five years previously. That is, of an entering class of 6,000, only 4,500 graduate. About 14 per cent of the entrants are dropped at the end of the freshman year. Complete data on this point are given in the study of student accomplishment to be published later.

Some Aspects of Human Anatomy Their Importance, Applications, and Correlation with Clinical Work*

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INTRODUCTORY

How to apply human anatomy, coordinate it in a sound and profitable manner with the other basic branches, and correlate it with clinical work, yet maintain and further develop it as a pure science, with its many possibilities in the training and disciplining of students and teachers, and through fundamental research aid in the advancement of medicine, surgery and the special fields, are problems that confront those who are charged with the responsibilities of the organization and operation of a department of anatomy in a medical school. And, since there are few branches in the medical curriculum in which the teaching and the comprehension of the subject matter do not require human anatomy as a prerequisite study, the problems involved in the program of anatomy affect many others who have to do with medical education and medical practice.

Just as medicine in general cannot advance far, nor, indeed, live by practice alone, so anatomy and the other so-called basic sciences of medicine cannot survive as sciences nor serve the medical program as widely and as effectively as they should when merely filling the rôle of handmaids to the clinical subjects. New and fundamental truths await discovery in every field of medicine and on these must depend real progress in the medical program.

Someone recently said that present-day teaching is too largely permeated by the atmosphere of the curative medicine of former days and too little by the modern outlook on preventive medicine. Modern human anatomy, while recognizing its function in curative medicine and its place as a prerequisite study to the other basic subjects and the clinical fields, has essayed to fill a more comprehensive and fundamental rôle in preventive medicine than hitherto. An understanding of this point of view is needed.

Only of late years, comparatively speaking, has human anatomy influenced the general medical program in a broad and fundamental manner. Before 1900, anatomy in American medical colleges and schools,

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with few exceptions, was largely limited to gross dissections, and was narrowly interpreted as a medical and more especially a surgical hand-maid. While human anatomy had served the latter fields moderately well for a long period, it had lost caste as an independent science, and from a productive and broadly scientific point of view, a more or less defunct anatomical field had come into being.

Today, a considerable group of scientifically trained anatomists and, fortunately, many leading clinicians recognize a wider scope and more vital meaning of human anatomy and see more clearly its real place and purpose in the entire scheme of medicine, both as a basic science and in its coordination and correlation with the other basic sciences and the clinical field. Anatomy is occupying these larger and more fundamental fields and accepts the challenge that goes with opportunity and duty in more effectively aiding the advance of medicine. Modern human anatomy would scarcely be recognized by many of the old workers in the field. In many medical schools it has attained the rank of a university subject, and when properly understood is infinitely more efficient in medical education.

SCOPE OF ANATOMY

Anatomical teaching and research fortunately no longer recognize the historic distinction between gross and microscopic and developmental anatomy. The human body is now considered from the phyletic, the ontogenetic, the histologic and the gross aspects. Human anatomy is concerned with the far-reaching problems of heredity and the physical basis of inheritance, variation, constitution and environment. Experimental morphology has come to the forefront. Many forms of animal life are being used in checking against human material and human results. While acknowledging the limitations of the experimental method on lower forms in reference to human medicine, much valuable information has already been given. The live body and the behavior of cells, organs and systems in the living state and under different environmental conditions, and the interrelations of systems are problems that concern the anatomist of today.

The importance and significance of researches in which the human patient is the material is, of course, recognized. While the dead body must still be used, and for reasons that are obvious, one daily sees the importance of living anatomy as compared with cadaveric material. The anatomico-physiologic and the anatomico-pathologic borderline fields are receiving more and more attention. The physical and chemical aspects of morphology are now recognized as being important.

It is clear, therefore, that modern anatomy, at least in the better

medical schools, is no longer restricted to a purely descriptive study and used primarily as a handmaid. Having expanded into its proper spheres, it now enjoys the dignity and importance of an independent science, having due regard for the limitations of independence; it is providing the required undergraduate courses in the medical curriculum; through basic researches, it is influencing the fundamental aspects of medicine in a wider and more scientific manner; and, when properly scheduled and presented and correlated, more effectively serves the immediate and specific needs of the clinical fields.

Generally speaking, then, three important aspects of human anatomy confront those who have to do with the organization and administration of anatomy in a medical curriculum. Want of understanding of this trinity of purpose and requirement of human anatomy in its relationship to the field of present-day medicine has brought some undeserved criticism in the teaching of this basic science.

1. THE UNDERCLASS COURSES

I venture the opinion that we all agree that the first purpose of anatomy in the medical curriculum is to provide a broad groundwork and sound training in elementary principles in the courses of embryology, histology and gross anatomy, to the end, that students (a) may be trained and disciplined by working with sciences in the abstract; (b) that they may master the immediate prerequisite needs of certain other basic subjects, and (c) that they may receive the specific and needful foundation for the entrance into clinical and other scientific work.

Since these courses are taken by the beginning medical student, they should be regarded and worked with primarily as pure and abstract sciences. The practical applications should not be regarded as being paramount at the outset. Intelligent applications cannot be made and rarely can an advanced position be attained in practical and clinical work without an adequate background. An inherent desire for knowledge in the abstract, apart from its applied use, in no sense belittles the useful and the practical. In this connection one must recall the many contributions of pure science to progressive medicine, some of them epoch making in their influence.

To this end, the beginning student should, first, gain a knowledge of the scope and meaning of the science with which he works; he should be permitted to develop initiative and personality, he should make his own observations, give his own descriptions and do his own thinking. Instructors should not become "lean-tos" for the student. Experienced and skilled supervision and demonstration in line with sound peda-

gogical principles is, of course, quite another thing, and without such teaching the student loses much. Other factors being equal, the combining of research with teaching makes the most effective and stimulating teachers.

Some one has said that to give all the theory first and to withhold the practice which enlightens theory until the end, is a pedagogic sin. Anatomy, however, is not a theory and, while certain clinical correlations can frequently be used to advantage in explaining certain basic concepts, to distract the student at frequent intervals by relating clinical experiences before he has acquired a sufficient groundwork to understand and appreciate them is likewise a pedagogic sin.

While it is clear that applied anatomy, as such, cannot be presented to advantage until considerable groundwork in the basic courses in anatomy has been mastered, and that the real correlation with clinical work must wait until the upperclass courses are introduced, certain things may be done to help bridge the interim period.

In framing the several courses in first year anatomy, teachers can and should anticipate the other basic and clinical subjects which are to follow, or may be running concurrently, and the future work of the practitioner of medicine. This can be done without curtailing the program in advanced work and research. In the underclass courses, the requirements are best accomplished by studying the human body as a biologic mechanism and not by the obsolete method of learning disconnected and isolated anatomic facts with a view of coordinating them with physiology and pathology and applying them later in medicine and surgery. The coordination and correlation is far easier and is more vital when the student conceives the human body as a living biologic mechanism. Frequently, as stated elsewhere, clinical correlations and interpretations can be used to advantage in illustrating and explaining basic concepts without negating the thought that the basic sciences of embryology, histology and gross anatomy should first be mastered by the underclass student as pure rather than applied subjects.

In connection with and as a part of the courses in gross anatomy, the living body should be studied, both unaided and by means of the fluoroscope and the roentgenogram. This helps the student to associate his anatomic knowledge, gained in working with dead material, with conditions existing in the living body and in the patient.

The correlation of structure and function is of the greatest value in the several courses in basic anatomy. In neuro-anatomy, especially, is the functional point of view almost indispensable. As pure morphology, the presentation of this subject loses much. After a fair groundwork in

structure and function has been mastered in the course of neuro-anatomy, case histories of patients, in which are portrayed a series of symptoms and signs, may be introduced and used to advantage in furthering the study of the morphology and function of the nervous system.

I see an advantage accruing to the underclass student by bringing him into occasional contact, say weekly, or semi-monthly, with properly selected patients or case histories and clinical subjects; the correlation having as its purpose the further elucidation of the basic science and the demonstration why abstract knowledge is important and how it is used in practical work. Since this is not the application and correlation that is required in the clinical courses and subjects, the subject matter and cases must be chosen properly, and the teacher must be possessed with wisdom and vision and have a clear understanding of what is intended. If the proper teachers are not available, the work should not be attempted. The thought is not new. The method has been carried out with success in several medical schools. I have tried it in the conduct of my own courses in anatomy and have become convinced that the correlation has value. While opinions may differ, my feeling is that the success or failure of the method rests with the one in immediate charge of such work.

2. ANATOMIC RESEARCH

An outstanding function of a department of anatomy in a medical college is to provide for pure and applied research in the several major and ancillary divisions of the subject and to conduct investigations of a comprehensive and fundamental nature in the furtherance of progressive medicine, both curative and preventive. Here a long-sighted and sustained policy is essential.

Through research and a modern conception of its functions, American human anatomy has become a living and growing science. Not to be conversant with the varied and extensive research program and the modern outlook of American anatomy and the many results already attained in the furtherance of progressive medicine, is to profess ignorance of one of the really outstanding advances in the medical program of today.

This is not the place to discuss the many activities in anatomic research. Suffice it to say, that studies in pure and applied anatomy and in experimental morphology and investigations of problems which touch the very root of medicine have, in many instances, yielded results which definitely and specifically influences the progress of medicine.

True, the researches of anatomists have covered and are now covering a wide field, and in some cases the application to medicine would,

on first thought, seem very remote. Who is willing, however, to make a prediction of the future usefulness of present-day research? We have had our lesson in this connection in a number of instances. A single reference will suffice: A few years ago an American anatomist made a careful study of the cells found in vaginal smears of the guinea-pig. Some doubtless considered the work a waste of time and out of place in an anatomic laboratory, but the results obtained by the use of this morphologic indicator method opened a new era in the study of the female reproductive system. This research led to many other direct and side investigations, resulting in some fundamental discoveries. The original research, in the end, proved to be applied anatomy of the highest and most important order. That this is so, is attested by the practical use that is being made by some of these discoveries in clinical obstetrics and gynecology and by workers in endocrine disorders.

Viewed from this aspect, there must be a revision of the prevailing conception of applied and practical anatomy. The terms must be more liberally interpreted so as to conform with actual accomplishments. In this connection it is interesting to note that through studies in morphologic response incident to diet and environmental conditions, another anatomist discovered a new vitamin, now utilized in practical work. The growth hormone was revealed through experimental studies in morphology.

No longer is it in order to criticize destructively the morphologic work done on lower forms by anatomists; to do so shows lack of understanding of things that are fundamental. While one must have in mind the limitations of some procedures in their influence on medicine, and that clinical men dare not use studies and results that are too visionary in dealing with human ills, at no time should interest be lost in this work in the hope that some beneficial discovery may result. Seldom has a human ailment been mastered by a direct attack.

True, the experimental morphologist, in a study of the structural changes and reactions of living tissues incident to growth, development and environment, supplements pure morphologic procedures by the use of applicable physiologic, chemical and physical methods in the solution of his problems. Few subjects, if any, are self-contained, and this integration of methods has proved a great factor in morphologic research. It is an illustration of effective coordination and correlation.

3. THE APPLICATION OF ANATOMY AND ITS CORRELATION WITH CLINICAL WORK.

The third problem of anatomy is to apply it and soundly and effectively correlate it with medicine and surgery and the special fields of

medicine. This aspect of anatomy is intimately tied up with curative medicine and surgery.

While a better understanding and closer cooperation between the so-called basic and clinical groups is highly desirable, much has been accomplished in this direction in recent years, resulting in better correlation and integration of effort. The charge that "recently the tendency has arisen for the teachers of the sciences ancillary to medicine to assume the rôle of masters rather than that of allies" is both correct and incorrect, at least in reference to human anatomy. It is correct in that American human anatomy now occupies the position of an independent science, always remembering the restrictions that go with independence, and practices a wider field and is far less restricted in its activities, no longer satisfied merely to serve the rôle of a handmaid. The statement is incorrect if the writer means to convey the thought that human anatomy in its newer freedom and greater activity is less efficient in medical education and practice.

Where and when modern human anatomy fails to serve the medical program effectively it is in all likelihood due to improper organization and inefficient teaching and, perhaps, to want of understanding and cooperation by the several groups. There are many problems in anatomy that await solution. In some instances anatomy has not caught up with clinical practice. But, clinical usage, in some instances, does not conform with modern anatomic thought. Anatomy is no more fixed than is medicine, save in a very general way, and old concepts must give way to new ones.

The application of anatomy and its correlation with medicine, surgery and the special branches are the problems that concern us in the present connection.

A.—It has been my experience that a very general course in applied anatomy in the third year of the medical curriculum, consisting of didactic and, what is more important, laboratory work, serves as a connecting link between the anatomic work of the first and second years and the real correlation with the clinical subjects of the third and fourth years. The work should be a part of the organization of the department of anatomy, but those in charge of the course should be both anatomists and clinicians. The teaching group for this course should include an active surgeon and an active internist, and, perhaps, one or more teachers working in the special fields. All should have had previous training in the several divisions of anatomy and should have participated in anatomic teaching and research. If the teachers are qualified as such and have the anatomico-clinical point of view and proper facilities and time

are provided, the problems involved in this general course in applied anatomy are solved.

The lectures and the laboratory work should be closely correlated. Surface anatomy, visceral and vascular projections and relations should be studied by means of the living model and the cadaver. Special topographic, regional and window dissections, prepared specimens and sections should be utilized. Roentgenograms and the fluoroscope are invaluable aids. The dynamic and functional point of view should be adopted in the presentation of this course. The purpose of the course must ever be kept in mind, namely, the application of anatomy to the general problems of physical diagnosis, medicine and surgery. The course is not meant to correlate anatomy with specific and individual case requirements, but to deal with generalities and the fundamental principles of practical and applied anatomy, problems of mechanism, etc.

B.—Apart from the elementary and general course in applied anatomy, surgical and medical anatomy should be continued throughout the third and fourth years of the medical course, correlated closely with the special or general clinical subject under discussion, the application and correlation being made by clinical teachers from a clinical point of view. No special course in applied and correlational anatomy is here required. If, however, the correlation intended is to be sound and if full advantage is to be taken of established anatomic facts; gross, developmental and minute, the clinical teacher must not only be informed and up-to-date in his own special field, but he must have a substantial modern knowledge of the subject to be correlated. This merely requires well trained and progressive clinical teachers.

The important correlation of anatomy with clinical work must be made by the clinician himself, or he must, at least, provide the setting so that it may be accomplished, and, when required, should be a part of the individual clinical presentation. All that the clinical teacher has a right to expect of the student as he enters on his upperclass work is that he comes to his clinical studies with a satisfactory anatomic background and has a ready and working knowledge of the gross, minute and developmental anatomy of the human body. The responsibility of the teacher of anatomy in this connection is as definite and as clear as that of the clinician.

In some instances greater tolerance should be practiced by the clinical teacher rather than unduly and severely criticizing a student for not remembering applicable details in anatomy. The time that has elapsed between the first year courses in anatomy and the clinical application and correlation must be considered. Then, too, the student has many

basic points to tie up with clinical work, many of which he will correlate himself, while in others he needs help and direction in doing so. The general course in applied anatomy, best given in the third year, to which attention was directed previously, is, of course, of great help and in many instances aids the student in making the application and required correlation.

Anatomists are not in a position to anticipate all of the peculiar and special requirements in individual clinical cases in medicine, surgery and the specialties, and, even if they could foresee all needs, no opportunity is afforded in the early part of the medical course to make the necessary clinical contacts. On the contrary, it may be argued that a clinician cannot be expected to know what phases of anatomy have been determined obsolete and should be discarded in teaching; what points are established as sound anatomy; and what progress has been made and results attained in anatomic research. This is, however, not a valid objection, and I see no way of escaping the responsibility on the part of the clinical teacher if the correlation of anatomy with clinical work is to be made efficient and practical. There are occasions when it is desirable that basic science teachers should participate, variously so, as the occasion demands, in the elaboration of a clinical subject. The method is mutually beneficial.

During a past session of my own medical college, I walked into the clinical amphitheatre and found the professor of medicine holding a clinic. At the time an upperclass student was demonstrating a human and several fresh mammalian hearts in which he had dissected the grosser portions of the auriculoventricular bundle of His. This was not new to the student, because the dissection of the His bundle was a requirement in his first year anatomy. He was, however, now doing it in a different atmosphere and for a different reason; the demonstration was to be one of the links in the study of an ailment in a living body.

Then followed a discussion by another student of the anatomico-physiologic aspects of the mechanism underlying the heart beat as it is understood today. This, too, had been studied in the courses in anatomy and physiology, now to be utilized in the study of an ailing human being. There was brief reference to pathology.

Then followed the presentation of a patient. The history of the case was read, the symptoms and signs were discussed, the required physical examinations were made, and the records of other examinations and analyses were introduced. Here was the setting for a complete picture. The professor, in a kindly, yet insistent manner, drew from the students who were assigned to the case, the basic facts; facts that largely

represented knowledge in the abstract in the earlier years of their medical work, nevertheless now necessary in an interpretation and understanding of the symptoms and signs presented by this patient and in making a diagnosis of the ailment. Adroitly, the teacher led the students to link up their anatomy and physiology with a specific clinical condition, and had the learners see that an intelligent interpretation would not have been possible without the basic facts of anatomy and physiology. The diagnosis was heart block; the correlation between basic and clinical facts was effective and of high order.

I left the clinical amphitheatre filled with enthusiasm at the beautiful demonstration in correlation, and happy in the thought that the basic subjects and teaching of the first and second years, elevated to higher planes through fundamental researches (but a relatively short time ago the conducting system of the heart was a myth) were recognized as being indispensable; that the students, even though they first mastered these subjects largely as knowledge in the abstract, could correlate them with clinical work when the opportunity arose and with the aid of an experienced and sympathetic teacher.

One of America's great surgeons, still active, urges a study and basic understanding of human embryology "as one of the foundation stones of surgical training." A prominent clinician and educator is quoted as saying, in essence, that if the changes in malignant cells are due to inherited qualities, our knowledge of cancer must wait until our knowledge of the physical basis of inheritance is much further advanced. In the meantime, human beings will be born, will fall prey to disease, and will be the victims of accidents. Immediate and specific attention and care will be required. Treatment and succor cannot wait for future research and preventive medicine and better safeguards. The patient is entitled to the best that science and art can bring at the time. Here is curative medicine, and the responsibilities of the basic science teacher are as great as those of the clinical teacher in preparing men and women for this immediate, urgent and ever present duty.

It is needless to enlarge on the method and spirit of the clinic, the admonition of a great surgeon, the reference to the physical basis of inheritance, and the demands in curative medicine. All of these point many important lessons.

DISCUSSION

DR. B. D. MYERS (Indiana University, Bloomington): I was very happy to hear an anatomic subject presented at this meeting. I enjoyed Dr. Schaeffer's presentation very much. I agree with him in his placing of applied anatomy and in his conception of what it should mean.

The Germans many years ago taught "Anatomic am Lebenden," in contradistinction to the anatomy which we get on the cadaver.

I think many of us assume that anatomy, being one of the old and well established subjects, is, perhaps, now a rather dead subject. In reality, there are many fields of anatomic study that are very new.

I happen to have in my possession the catalog of one of the grand old medical schools of 1907. That school gave two lectures a day, six days a week, in anatomy. Think of that as a type of anatomic teaching of twenty-five years ago. I suppose they gave more lectures a week in anatomy than are given in a whole semester in these days.

In 1902 I came back from the completion of my medical course in the University of Leipzig feeling dissatisfied with my knowledge of neural anatomy. I wrote my chief (as he was to be for the next year), Dr. Mall, saying: "I wish, on arriving in America, to go to some place where there are brain sections already cut, where I may study brain anatomy without going through the trouble of making brain sections myself." He answered: "There is no such place in America." That was in 1902.

I think that you clinicians sometimes take credit to yourselves and glory to yourselves in the accomplishments of your clinical students, that really goes back to the courses in anatomy. What are the fundamentals of the making of an outstanding clinician? First of all, he must make fairly accurate observations. If he cannot see the thing before him as it is, there is no hope for him in clinical medicine. Second, he must draw fairly accurate conclusions from the things he sees.

The beginnings of accurate observations and deductions go back to instruction in anatomy. But there is something else the department of anatomy has to do. It has to provide much of the student's vocabulary. There are some five thousand anatomic terms with which the student must familiarize himself in the course of anatomy, and they are important.

Suppose a garage man can tell you all about how a carburetor works and does not know it from the self-starter when he raises the hood! That corresponds to the kind of anatomic teaching that used to be given in the days of didactic instruction when a student could tell you all about the location and function of an organ and yet not recognize it when confronted with a dissection.

I might say that one of the most interesting and most fascinating investigative fields of anatomy today is that of the sympathetic (parasympathetic) nervous system. Some twenty-five years ago, when visiting one of the great hospitals of the East, I saw a case with one of the great clinicians of the day. There was a neck tumor, and a change in pupil size. He said, "I am helpless. Why should a tumor in the neck give rise to a change in the pupil?" Today every clinician knows the answer to that problem through a better understanding of the sympathetic nervous system.

I realize I am getting far off the subject of this paper but I should like to leave the impression here that anatomy is a very live subject and it is a growing subject, a developing subject, and I know of no field of investigation in the last quarter of a century in anatomy more fascinating than that which centers around the sympathetic nervous systems of today. Again, may I compliment Dr. Schaeffer on his paper and say you cannot get away from applied anatomy any time and any place in the clinical years of the medical course.

DR. A. S. BEGG (Boston University, Boston): If one has the idea that anatomy is a dead subject and deals with dead material only, the best thing he can do to correct this misapprehension is to attend a meeting of the American Association of Anatomists. The work to which Dr. Schaeffer has referred in the way of research is remarkable in this field. My own colleagues in the school tell me that when they go to the anatomists' meeting they learn more physiology than they learn in the physiologists' meetings, and when they go to the physiologists' meeting, they learn more biochemistry than when they go to the biochemical meetings, and when they go to the biochemists' meetings, they learn more about endocrines than they learn in the clinical meetings. Perhaps the shift in emphasis is justified with the development of time.

We are very much interested in this correlation movement. We have been doing something with it for quite a long period of time and we do it for two reasons: first, to show the student that there is something practical about the thing that he is doing in the histology laboratory or in the dissecting room; second, we also like to show him that the clinical men who always conduct these meetings are utilizing facts which the student is now acquiring in earning their daily bread. We do not object to the clinician talking a little over the head of the student. It is quite all right. It will not be so very long before the student will catch up with the clinician, and in later years the clinician will feel that the student is talking somewhat over his head in some branches of medicine. The exchange is not a bad one.

The question of applied anatomy and where it belongs has bothered some of us considerably. We have been brought up on the old two-year courses in anatomy, where we think that the teaching was probably overdone from the standpoint of hours. With the development of the teaching of applied anatomy we have seen the subject introduced into the fourth year but we have finally reached the conclusion that it really belong in the third year. We agree with Dr. Schaeffer that the emphasis on anatomy by the clinical men is of the utmost importance and we are constantly seeing just the sort of thing to which Dr. Schaeffer referred.

There is another fact: the men who are now coming up through the teaching departments of the schools are men whose fundamental training is superior in many instances to that of their seniors, and we are finding this middle group, if we can put it that way, much more prone to call on the fundamental sciences in their clinical explanations. Dr. Schaeffer has made a real contribution to call attention to the status of anatomy in this general story of the medical school.

DR. EDGAR ALLEN (University of Missouri, Columbia): Dr. Schaeffer has stressed matters of place and purpose. Of course, the purpose would be a second inoculation of anatomy; the place, varying in different schools, some-

times in the second year and sometimes in the third year. But what is the relative position of applied anatomy in the curriculum? Dr. Coughlin mentioned sixteen hours for one semester. Many schools give more time to it, but you will find that it usually receives less than one-tenth of the total scheduled time. It is shouldering for a legitimate place with bacteriology, pathology and clinical subjects.

The principal point in my mind has been to try to keep the review that the students make in this applied anatomy detailed and efficient enough to be worth while. There are so many facts to be covered and a superficial, careless review merely undermines the student's ability to work carefully and with thoroughness. It seems to me that the biggest problem in applied anatomy is to place the initiative on the student and see that he does certain parts of the total assignment thoroughly enough so that he retains the main points and does not really injure his procedure by doing it too superficially.

The Foreign Medical Graduate*

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The obligation of American medical science, education and practice to Europe is too great and too obvious to require more than passing comment before such a gathering as this. Probably the majority of those present have at one time or another broadened and deepened their knowledge of medical science in the universities, hospitals and laboratories of all the European countries. It is not too much to say that without the tradition of medicine in Europe the present high standard of medical science in the United States could never have been reached.

These facts are so generally recognized and self-evident that it requires no little courage even at this time to point out some facts in reference to the status of European trained physicians in the United States without appearing ignorant, provincial or chauvinistic, and it is with the greatest respect for the truly great tradition of European medical schools that I venture to bring these facts to your attention.

Similarly, it would be supererogatory for anyone to waste the time of this gathering in pointing out the extraordinary progress that has been achieved during the past twenty-five years in the fields of medical research and medical education in the United States. I need only mention the effect of the Carnegie Report of 1910 in exposing the existence of low standard and commercial medical schools throughout the country and their prompt elimination through the action of the Council on Medical Education, the Federation of State Boards of Medical Examiners and the Association of American Medical Colleges as well as the tremendous developments not only in physical plants but in educational facilities which have characterized American medical schools in the last fifteen or twenty years.

Curiously enough, however, the one factor which, perhaps, more than any other has contributed to raising the standards of our medical education has been one which was neither deliberately planned nor even anticipated by those most concerned with its accomplishment. While too much can hardly be attributed to the influence of increased preliminary standards, improved laboratory and clinical facilities and an increased number of full-time professors in improving the quality of medical education in the United States, it is not improbable that the accidental restriction in the number of medical students admitted to med-

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ical schools throughout the United States and Canada each year and the competitive selection of these students is a most significant factor in the situation.

This has been brought about by two contrary tendencies—first, the extraordinary increase in the number of academic students in American universities during the past forty years, especially since 1918; and second, the relatively fixed number of students which our medical schools can train properly. The studies of Dr. Burton D. Myers have shown that there are approximately thirteen thousand technically eligible applicants applying for admission to our medical schools each year. This is not surprising when it is noted that the percentage of college students between the ages of 18 and 22 years has risen from 2.34 per cent of all persons in that age group in 1890 to 12 per cent in 1930, so that at the present time there are no less than one million students in American colleges and universities.

Since collegiate training is a natural path toward the professions, it is surprising that no more than thirteen thousand desire to study medicine each year.

On the other hand, the number of students that can be considered each year has become fixed and limited in two ways. Apart from the fact that there is no obvious demand for the training of a large number of physicians in this country, the great expense of establishing new medical schools on a pre-depression scale has automatically limited the number of such new institutions. Operating in the same direction, the high standards set for medical schools by the Council on Medical Education, the Association of American Medical Colleges and the various state boards, has made it impossible for each medical school to accept more than a given number of students per year—namely, the number for which each school had adequate educational facilities.

Dr. Myers has shown that the number of freshmen admitted in the United States and Canada each year is approximately six thousand.

Whatever question may be raised as to the ability of the various medical faculties to select the most promising six thousand of the thirteen thousand annual applicants, there is no doubt that they have attempted to perform this very difficult task to the very best of their abilities, and there is also no doubt that the quality of the students in our American medical schools at the present time has been very greatly improved by this restriction in number and competitive selection.

The rejected seven thousand, however, have created a new problem affecting standards of medical education and practice, which is the immediate subject of this paper.

"What becomes of this excess group?" is a very interesting question

which I, for one, am quite unable to answer. The only definite fact before us is that during the past five years there has been a very definite migration of American college students to European medical schools, so that at the present time there are no less than two thousand students who have been refused admission to American medical schools on the basis of competitive selection who are studying medicine in Europe, practically all of whom anticipate returning to the United States to practice their profession.

It would, of course, be grossly unfair to stigmatize the individuals of this group as inferior, and doubtless it contains a not inconsiderable number of very excellent students. Taken by and large, however, it cannot be denied that this group is made up of two thousand or more students who were rejected on the basis of competitive selection for admission to our medical schools, and to this extent, at least, they must be considered as constituting a relatively inferior group. In addition, not a few of these students have previously been admitted to American medical schools and having failed to keep up with their work they have been dropped or been asked to withdraw.

If this migration of rejected American students to Europe continues, as there is every reason to believe it will, their ultimate return to practice in the United States might very readily bring about a lowering of the quality of medical service in this country. In addition to the relative inferiority of this group, as compared to the six thousand students accepted for admission to our medical schools, most of these students are suffering from the handicap of studying a very difficult science, taught in a language with which they are absolutely, or at least relatively, unfamiliar. Another handicap in their education is the marked difference in the entire university tradition between Europe and America.

Finally, we must frankly face the question as to whether or not at least some of these students may not be exposed to a professional training which is in many ways inferior to that now required in the United States, and which does not adequately train American students for the proper practice of their profession in this country.

In an effort to evaluate this last and very debatable factor, I have made a study of the relative achievements of students from New York State, other Americans and foreign trained applicants for admission to the New York medical licensing examination during the eight year period, 1925-1932, inclusive. While I am the first to recognize the language difficulties of foreign graduates, and the fact that achievements in the state licensing examinations are not the best test of a medical school's state licensing examinations are not the best test of a medical school's

standards, it cannot be denied that the results are of considerable significance and merit great consideration.

These figures are based on 8,562 applicants examined, of whom 3,960 were graduates of New York schools, 3,308 of other American and Canadian schools, and 1,294 were graduates of foreign medical schools. Among the graduates of New York State schools there were 4.4 per cent of failures; among all other American and Canadian graduates there were 10.8 per cent failures, while among the foreign graduates there were 57.9 per cent of failures. Similar figures published by the Council on Medical Education and Hospitals of the American Medical Association for 27,828 applicants for all state licensing examinations during the five-year period, 1927-1931, inclusive, give very comparable results. There were 4.5 per cent failures among all the Americans, including Canadians, as contrasted with 50 per cent among all foreign graduates, of whom there were 1,157.

These facts will be illustrated by the following figures selected at random from graduates of certain foreign medical schools:

	Candidates Examined	Number Failed	Percent Failed
AUSTRIA			
University of Vienna.....	109	55	50.5
BELGIUM			
University of Louvain	9	6	66.7
CZECHOSLOVAKIA			
University of Prague	26	10	38.4
FRANCE			
University of Paris	18	8	44.4
GERMANY			
University of Berlin	51	27	53.
University of Leipzig	11	5	45.5
University of Munich	20	10	50.
HUNGARY			
University of Budapest	95	38	39.3
ITALY			
University of Bologna	12	6	50.
University of Naples	280	216	77.1
University of Palermo	59	57	96.7
University of Rome	57	37	64.9
RUSSIA			
University of Kharkov	33	23	72.7
University of Moscow	17	10	58.8
SWITZERLAND			
University of Bern	26	14	53.8
University of Geneva	17	6	35.3
University of Zurich	19	8	42.1

With the exception of graduates of the University of Paris, the number of candidates from French schools is too small for statistical purposes. The same is true of the graduates of British schools, although the small number of these graduates have made an exceptionally good record in the New York examinations.

Only a thorough first-hand study of European medical education can reveal the explanation for these figures. However, I venture to suggest, in passing, two important factors—first, the European tradition of admitting to any branch of university studies, including medicine, any student who has been admitted to the university by completing a gymnasium or lyceum training, irrespective of the number of students or the scientific aptitude of the individual student; and, second, the great reliance based on the preparation for and passing of examinations. In this country it is generally conceded that examinations are not the best test of a candidate's education and much greater reliance is based on personal inspection of the medical school in which the student studies. I think it may fairly be stated that the American method of inspection and registration of medical schools has, at least, raised the minimum standard for admission to the practice of medicine.

In the light of these relative achievements, the question must be raised as to whether or not American students studying in these institutions are exposed to a course in medical education comparable to that maintained in our approved medical schools.

If these facts have the significance which I believe may rightly be attributed to them, the danger of lowering our standards of medical practice will come from two about equally important factors—first, the immigration of native born European trained in European medical schools; and second, by the return of American-born students trained in European medical schools. In view of the operation of the immigration quota in diminishing the number of foreign-immigrants, it is probable that the American student is the greater factor.

I do not propose at this time any solution to these important problems. I merely bring them to the attention of this Association, which is vitally concerned with standards of medical education, for such consideration as they may deserve.

The Basic Principles of Education and Instruction in Roentgenology

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The recent appearance of numerous articles on the need for education and instruction in roentgenology would signalize the fact that all is not well with this branch of medicine.

It is not the author's intent to discuss or urge the recognition of roentgenology as a specialty. That this is most desirable and even essential will become evident as one continues to read.

Ignorance is an irritating word to apply and when used appears to set up a resentment and resistance to reason that nullifies any effort at counteraction. It is, nonetheless, a fact that in the educational scale, from the average man up to the university executive, there is a lack of comprehension of matters radiological, that ranges from discouraging public misconception, through pitiful medical misinterpretation, on to unjust administrative decisions, along with dangerous legislative enactment, all ascribable to inefficient pedagogic superficiality.

In outlining a program of education in this or any other branch, soft phraseology applied to the ills and apologetic suggestion of the needed instruction will hardly suffice. By comprehension of basic principles, by assiduous avoidance of misstatements, by the unbiased presentation of solid facts, and by the frank admission of shortcomings and errors, the remedial needs should become self-evident.

To be sure, the foregoing appears as severe criticism, but is hardly strong enough to elucidate the resultant diagnostic, therapeutic and surgical misapplication when any one (medico or otherwise) can, without proper training, employ so potent an agent, for both good and evil, as the roentgen rays. This applies not alone to the so-called radiographer (lay technician), who by close contact with the patient, applying a diagnostic procedure, to say nothing of attempted pathological interpretation or treatment, is morally, illegally practicing medicine.

One of the first things that all of us must learn sooner or later is that God has, with the degree of medicine, not conferred unlimited knowledge and ability in all matters medical, including roentgenology, nor has special dispensation been granted in roentgen interpretation without the necessary labor entailed in acquiring a considerable diversity of fundamental knowledge peculiar to this specialty; training and ex-

perience more extensive and exacting than required by any other specialized branch of medicine.

There are laws regulating the sale and use of firearms, narcotics and even alcohol, but any concern can manufacture and sell, and any one can buy and operate an x-ray machine.

The average lawyer's concept of roentgenology is (Oh! so pitifully) meagre, yet he can noisily bluff an unsuspecting jury into a faulty decision, because roentgenograms are admitted as photographic evidence on which every and any one entertains and expresses his misconceived opinion.

The advent of roentgenology has been so recent, its advance so fast and adaptation so universal, that general knowledge, education and instruction therein has lagged and not yet caught up with the rapid scientific progress made. It would, therefore, appear wise to pause to apply the constructive remedial methods required to meet and surmount the faults that have developed. The immediate needs are:

1. Carefully prepared, wide-spread publicity, that the whys and wherefores of roentgenology be better comprehended.
2. General, intensive, postgraduate education that the general practitioner may the better apply the information imparted by radiological study and realize the types of cases wherein roentgentherapy is indicated.
3. Organized, systematic, undergraduate instruction that the student may know why, when and how the roentgen rays are to be applied in practice.
4. Protracted study courses for the specialist in roentgenology with recognized licensure.

GENERAL PUBLICITY

(a) Roentgenograms and Pictures. One of the basic causes of misunderstanding is the false concept that a roentgenogram is a picture, comparable to the camera made photograph. It is (perhaps unfortunately) true that in one of the radiologic procedures photographic materials are used; but the simile ends with the similar appearance of negatives and prints. A roentgenogram is neither produced nor can it be viewed and interpreted, in the generally accepted sense of a photograph. A photograph is produced by reflected light from the surface of an object. A roentgenogram, on the other hand, is the product of direct transmitted energy, more on the order of a silhouette. However, here the simile ends again since a roentgenogram is a record of different intensities which depend; first, on the varying degree of penetration of the rays and second, on the several structural densities of the object exposed. It may, therefore, well be said that whereas a photograph

shows (even in perspective) surface conditions, a roentgenogram reveals the internal structure in three dimensions. It is, therefore, most important, in differentiation, to remember that, though the roentgenogram, like a photograph, is viewed in a plane, it is nonetheless composed of a superimposition of structures, like superimposed objects of varying degrees of translucency. (The fact remains that a roentgenogram is, in the main, purely a means of estimating or measuring relative structural densities.)

(b) Fundamentals of Roentgenology. In our present day comprehension and scientific evolution of the several methods of measuring and recording roentgen intensities (for medical diagnostic purposes), photographic materials appear the best yet evolved. It is in this connection that the word "unfortunately" was used, since if some method or materials, other than photographic were employed in roentgenology, then this misconception that roentgenograms are pictures would not exist. Furthermore, it never seems to occur to the average individual that there are definite physical laws that determine the production and influence the interpretation of the roentgen image. The important influencing physical factors are not alone ascribable to the superimposition of different structures of varying densities, but also the focal distance and ray divergence, the size of the focal spot and the distance of the object from the film must receive careful consideration in interpretation. These technical variations are responsible for the fact that objects furthest removed from the recording film suffer considerable distortion, are hazy in outline and lacking in detail whereas, conversely, objects nearest the film have the truest projection.

It should be evident, because of the foregoing facts, that a single exposure is rarely sufficient to permit an accurate interpretation or localization of a given lesion. Not alone is the proper application of technique essential, but the physical principles involved form a most important part of interpretation. Still further than this, the final diagnosis often depends on a combined fluoroscopic and radiographic study in which the symptomatic data are gathered from the different technical procedures employed or from several exposures serially made.

In other words, this means that, as a rule, a single exposure is of but little value. Various data are usually gathered from several films which combined supply clinical and pathological information summarized into a final interpretation or diagnosis.

(c) Roentgen-clinical study. When the general public appreciate the fundamental principles of roentgenology, they may be relied upon to choose the recognized and experienced roentgenologist; their own

well-being depends upon their avoidance of the charlatan as well as the individual of doubtful ability, and the unethical commercial laboratory. Public comprehension that a roentgen examination is a form of clinicopathological study and that they are paying for a professional interpretation and opinion, will go far toward the realization that roentgenograms are but a means to an end, and of but little value as pictures to any one excepting those with education, training and experience in this specialty.

With better understanding there will be a little less unqualified and ill-considered expression of opinion; the peddling of roentgenograms at so much per picture should materially diminish and their value as court exhibits and evidence, unsupported by expert interpretation, will fade materially.

(d) Ownership of films. In view of all that has been said and since a roentgen-film is but a means to an end, i.e., valueless without expert interpretation—and since even several roentgenograms may individually form only a part of the total summation of a given case, the question of ownership of films should once and for all be settled: A patient pays for an examination, interpretation and opinion as an aid to proper diagnosis and treatment; he has neither comprehension nor use of the films employed and is, therefore, no more entitled to the materials used in this procedure than he is to the apparatus and appurtenances employed in a chemical analysis or the specimens or slides of a bacteriological or pathological laboratory study.

(e) Legislation. Enlightened public opinion should eventually lead to proper legislation regarding the manufacture and sale, purchase and operation of x-ray equipment, placing these unequivocally under specialized medical licensure and control and abolishing legalized charlatanism. (Momentarily, in this connection, the licensing of lay radiographers as such should be prevented, lest, as in practically every other instance, the insufficiency of legal limitations lead us to regret ever having considered such certification.) X-ray interpretation and treatment are both diagnostically and therapeutically strictly medical procedures and with the patient's best interests at heart, should be conducted only under direct expert, medical supervision.

A few remarks with regard to certain types of radiological procedures might be acceptable insofar as imparting information, as far as possible, to the general public of what constitutes a reasonably satisfactory examination of various parts of the body.

(f) Outline of Roentgen Examinations. No examination of the alimentary canal would appear complete without an x-ray study. There

are many diseases of the various abdominal organs which are discovered and interpreted only by means of a roentgen examination.

Excepting in the occasional acute case, an exploratory operation without x-ray examination should rarely be required. The opening of an abdomen for tumor and finding a near term pregnancy is an unforgivable error caused only by the neglect of a proper x-ray examination.

Whereas, the opaque meal by mouth is used for the study of the esophagus, stomach and intestines, a detailed study of the colon requires an examination by barium enema.

A proper examination of the stomach and intestines may extend over two or three days; this does not mean that the patient would have to remain in the hospital or physician's office for this full period. However, at least two types of meals are usually ingested. The first examination usually continues for the better part of an hour and includes both a fluoroscopic examination followed by a series of radiographic exposures at given time intervals.

It stands to reason that there must be a time lapse to permit the opaque meal to pass along the various parts of the alimentary canal. Such foolishness as was recently exhibited by one of the moving picture productions in demonstrating the food bolus in the colon within a few moments after ingestion by mouth is, from an educational standpoint, most ridiculous. The follow-up examinations on succeeding days are for the purpose of tracing the course of the meal throughout the various parts of the intestinal tract.

The colon examination as above referred to requires a complete cleansing of the gastro-intestinal tract before x-ray examination. Castor oil in large doses is the preferential method of preparation.

Examination of the urinary tract should also be preceded by thorough cleansings of the bowels.

By the use of special dyes either intravenously or orally ingested, a study of such hollow organs as exist in the urinary tract as well as gall bladder and hepatic systems become feasible; a protracted serial study in such cases is usually required. The gall bladder examination may extend over a full day. Single exposures are usually of but little value, interpretation depending upon the data as compiled from a number of exposures made at different time intervals.

The accuracy of the information obtainable by means of x-ray examination for diseases of the lungs and heart are such that no physical examination of the thorax should be considered complete without a thorough roentgen study thereof.

A radiographic record of the chest at least once a year, kept on file for reference purposes of every individual, would form a most important supplement to a routine health examination. However, any examination that is worth making at all should be satisfactorily done by competent individuals. The quick, "look—see" method, as unfortunately employed by some, without a photographic record affording detail study, is usually an inefficient, valueless procedure.

In view of the frequent requests for curtailment of our system of conducting examinations, it would be well here to state that any short cut method of arriving at an opinion or diagnosis is most dangerous.

In fact, with ill defined and indefinite data, the case is usually most difficult and the writing of a negative report requires more protracted and detailed study than when the lesion is grossly self-evident.

Nearly everyone today appreciates the value and importance of x-ray examinations for injuries and diseases involving the bones and joints. It does not appear to be so well known that technical means have been devised to render difficult and otherwise obscure parts of the human anatomy radiologically visible.

By the use of contrast media in various body cavities and even by air injection of the ventricles have otherwise obscure conditions and diseases of the brain been brought to light.

The important point for the public to remember is that only the man with training and experience (the specialist in roentgenology) should be entrusted with the technical, interpretive and diagnostic problems involved.

(g) Roentgen therapy. The public also needs a clearer understanding of the value of the x-rays as a therapeutic agent. Dangerous, to be sure, in the hands of the unskilled but a most potent agent for good if properly applied.

There are certain diseases of the blood and lymphatic system in which the x-ray is today the only reasonably satisfactory method of treatment. There are tumors of lymphomatous character, often in such locations that the surgeon is only too willing to turn these over to the radiologist for treatment. These include several types of lymphomata as well as sarcoma and embryonal, sex cell tumors which, irrespective of their location, usually yield to properly applied x-ray therapy.

X-rays, radium and especially surgery have been sufficiently advertised to cause the public to realize that these are the only recognized methods of treating cancer, in any form, today. I wish, however, to go on record as stating that with better comprehension and proper application of the x-rays and radium and greater cooperation between the radi-

ologist and the surgeon, a definite improvement in the end results in the treatment of neoplastic disease should be attained.

In any suspected tumor case, the best procedure to follow would appear to be:

1. To seek the advice of a family physician at once.
2. In consultation, to get the opinion of a competent roentgenologist.
3. To consider the need of surgery last.

The author has ample proof that much of the cutting today is needless, useless and often even dangerous. Therefore, the combined opinion of the general medical man, roentgenologist and diagnostic surgeon in cooperative consultation should be sought before surgical interference is attempted.

The permanent removal, without recurrence, and excellent cosmetic results obtained with properly applied intensive radiation therapy in superficial malignancy are so uniformly and remarkably good that it is almost beyond comprehension that this method of treatment has not superseded all others. The only prerequisite to producing such satisfactory result is the necessary training and experience in the handling of this type of case and in the proper administration of the treatment. The method is painless, often requiring but a single intensive treatment and is usually accomplished without, in any way, interfering with the routine occupation of the individual.

POST-GRADUATE EDUCATION

A. General Consideration. Much of the descriptive matter that has been included under the heading of General Publicity, also applies to the rank and file of the medical profession and will not be repeated here. As already stated, the advent and advance of roentgenology, in all its phases, is all so recent and rapid that in many respects only those most intimately associated with and interested in this highly specialized field, have kept pace with the progress made.

It is more than desirable that the general practitioner should have a better comprehension of the fundamental principles involved in roentgen interpretation. This does not mean that extensive knowledge in electrophysics is required, or that the general practitioner needs to become an expert technician; on the other hand, a reasonable comprehension of the physical principles involved in posture and projection along with a knowledge of the Roentgen appearance of the anatomical parts under consideration is necessary for intelligent interpretation.

B. Normal Physical and Anatomical Factors. Sight must never be lost of the fact that a roentgenogram is not a picture but that it is a

record of superimposed tissues of varying structural densities. A clear concept of average normal appearances, including the variations resulting from technical, postural, developmental and borderline changes, are all quite essential when attempting roentgen interpretation.

Further physical factors, of importance in differential diagnosis, are to observe whether there are signs of retraction and contraction or pressure displacement and enlargement; whether fluid levels or air bubbles change their relation with gravity. The proper technical application with respect to physical laws are essential for such interpretation, and it can safely be said that that part of roentgen interpretation founded on physical facts is a science; whereas the interpretation founded on clinical pathological data, as radiologically observed, still belongs to the medical art.

Only after the mastery of the fundamental principles of roentgenology, as above outlined, is one prepared to engage in a detailed study of the character and identity of special diseases; this requiring careful attention to the origin, location, special predilection, method of extent or limitation and progress of a lesion which combined with the clinical data, lead to more accurate interpretation and refinements in diagnosis.

Risking partial repetition, the re-statement of certain facts may, nonetheless, be acceptable.

A fluoroscopic or radiographic image is the result of the projection and superimposition of varying structural densities, one upon the other, wherein due to the divergence of the rays, there is a distortion of objects furthest removed from the film. In view of these facts only those parts in closer contact with the film show the truest projection, and are sharpest in outline and detail, with the least degree of distortion; the converse of this having already been mentioned in a previous paragraph.

These facts are easily subject to proof and comprehension with the very simplest of demonstrations, by ordinary silhouette light projections and leave no doubt as to the necessity of a composit study of a number of projections in different directions (or possibly serially made), ere an interpretation is attempted.

C. Roentgen Pathology. Only with a clear understanding of the normal, including numerous border line variations, can one attempt the interpretation of pathological processes.

One must have a clear concept of the variations in roentgen intensities, produced by exudative and productive infiltration, degenerative, proliferative or hypertrophic changes, etc. After thorough comprehension of the roentgen appearance of gross pathological processes as these occur

in the various tissues and organs, then only is one prepared to proceed to the interpretation of special diseases.

There is, unfortunately, too little instruction along these fundamental lines, it being the all too general tendency to hurdle at once into the field of the rare, exceptional and bizarre. The irrepressible desire for so-called research and something new, might well be restrained until there is better comprehension of common current material and that which may appear old.

D. Clinical-Roentgen Interpretation. It can concisely be stated, that no Roentgen interpretation is deserving of the term diagnosis, without full consideration of the clinical data involved. It is also a fact that many a roentgen examination, such as that of the gastro-intestinal tract, is of itself a clinical, symptomatic radiological study and not merely a problem of illustrating a defect.

The question of film ownership, legislation, etc., has received sufficient consideration to require only re-mention here.

E. Type of Examination and Preparation of Patient. It should be self-evident that an examination of the osseous structures or soft tissues, especially of the trunk or abdomen, cannot be properly conducted at the same time that a contrast medium, orally ingested, is employed. In such an examination as that of the lumbar spine, bones of the pelvis, genito-urinary tract, gall bladder, or other examinations for soft tissue lesions, a thorough cleansing of the intestinal tract is essential, with the avoidance of contrast media in any form, excepting in specific instances.

Naturally, the visualization of hollow organs requires the use of contrast media. There should, however, be as little interference with normal function as possible when such examinations are in progress. The study of motility also requires a given time lapse; most examinations of this kind being serially made and extending over two or more days. It is, therefore, evident that examinations directed to different organs and types of tissue require different preparation and may extend over several days.

It should also be apparent that the closest cooperation between the clinician or surgeon in charge of the case and the roentgenologist is essential if the utmost from any radiological procedure is to be obtained.

If the clinical picture is so vague as to preclude the possibility of a tentative diagnosis, then a list of the possibilities should appear so that the several roentgen procedures may be applied with the intent of arriving at a diagnosis by exclusion. Though the clinician assumes the responsibility for the clinical possibilities in any given case, the preferential method of procedure should be left to the roentgenologist.

There is a list of diseases far too extensive to be enumerated here in which roentgen therapy is indicated. In some of these diseases, radiation therapy is the only procedure that may offer the patient relief. In other cases it may be employed either as an alternative or supplementary measure.

A better understanding of the radio-sensitivity of different tissues and organs would be of considerable aid in the determination and selection of the type of cases best suited to radiation therapy.

These problems would appear best met as follows:

(1) By a series of well prepared presentations on general roentgenology, either at regular medical society meetings, or as separate lecture courses and demonstrations in various parts of the country.

(2) For those desiring a more detailed study of the problems, intensive courses of from one and one-half to two months duration, on part time, in an institution properly organized for such instruction is essential.

The lecture and demonstration courses could, at best, but afford an outline of the possibilities of roentgen diagnosis and therapy; whereas the more protracted, intensive institutional courses could lay a better foundation for roentgen interpretation.

It is self-understood that instruction such as the foregoing is not intended for the expert but encompasses fundamental basic facts that any one presuming to comprehend a radiological study should know.

UNDERGRADUATE INSTRUCTION

The present day methods of undergraduate instruction are most haphazard and unsatisfactory. Not until proper instruction in roentgenology is included in the curriculum of undergraduate medical schools, will the present lack of comprehension, misunderstanding and chaos continue.

The demonstration of films of pathological cases to large or even small groups of medical students who have not had preliminary instruction in the fundamentals of interpretation is a hopelessly useless procedure.

The guessing contest, at a bedside conference, on x-ray films as if these were photographs of the patient is a sorry way of teaching the radiological aspect of the case.

The presentation in the medical amphitheatre, of a short focus chest film made in the ventro-dorsal direction, turned hindsideside, upon which heart measurements are attempted, is a pitifully ludicrous sight to the initiated.

The science and art of roentgenology is lost with the presentation of a few films in an already over-spectacular and vain-glorious operating room atmosphere.

By the foregoing is meant that the present day hapahazard method of using x-ray films in clinical medicine as photographic illustrations which any and every one presumes to comprehend and interpret is radically wrong. Teaching in roentgenology should only be done by those thoroughly trained and under the supervision and control of an experienced central head.

The medical training in physics should touch not alone upon electrophysics as it pertains to electromedical apparatus but should include an outline of high tension equipment as used in roentgenology, this supplemented with fairly comprehensive instruction on radiation physics.

In biology the influence of radiation on different tissues, structures and the organism as a whole, should receive reasonable attention.

The chemistry of radiation therapy is as yet too little understood to justify serious basic instruction. It is a matter, however, deserving of study and research.

The study of anatomy should include roentgen studies of the different parts of the body in the normal. Special lectures and demonstrations would be required so that the technical and physical factors represented in the various projections be more thoroughly comprehended. Since roentgenograms are not the photographic reproductions they appear to be, this part of the work requires the supervision of an experienced roentgenologist, and should be incorporated in the regular courses in anatomy.

In physiology the study of the function of various organs in the normal, using contrast media where required, is a branch of the study that must of necessity, again be under the control of the experienced roentgenologist who will be capable of stressing such variations in functional behavior which may have important bearing on future pathological interpretation.

The study of the respiratory phases of inspiration and expiration, diaphragmatic excursion and relative changes in mediastinal contents along with heart and vessel pulsations are important agenda.

By the use of contrast media, the functions of the various portions of the gastro-intestinal tract may be studied with the student acquiring a fair concept of type in relation to status, relative position, contour and mobility, peristalsis, evacuation and motility.

In roentgen pathology, it is all important that one have a clear comprehension of the observed radiological changes produced by the various

pathological processes in different parts of the body. Therefore, preliminary to the study of special diseases, the student should have a mental picture of the roentgen appearance of inflammatory, exudative and productive infiltrative processes as well as the general appearance of degenerative, proliferative, hypertrophic and other pathological changes as occurring in the different tissues and organs.

The importance of physiological and physical, including hydrostatic principles in interpretation, can hardly be too strongly stressed. These data, supplemented with a thorough drilling in a carefully prepared analytical scheme of examination, should form a most important part in the fundamental training of any medical student. With the completion of the above outlined course, the student is prepared to study the origin, location, demarcation, course and extent, primary and secondary changes and gross pathological characteristics as they occur in special diseases.

The intent of the foregoing is not at all to make specialists in roentgenology of the general medical student, but just as a basic knowledge of chemistry, histology, bacteriology, pathology and all other allied sciences are required in a medical course, so should there be a truthful presentation of the basic principles of roentgenology which find so general application in practically all branches of medicine today.

SPECIALIST IN ROENTGENOLOGY

There is no doubt that much harm has been done by the presumptive and false statements and deleterious effects due to inexperienced and inexperienced so-called roentgenologists.

Until in roentgenology or, as a matter of fact, in any specialty, specific requirements have been met, the present day unfortunate charlatanism will continue.

The essentials are:

1. The need of proper training,
2. Accredited recognition and
3. Legal protection.

From the specialist in roentgenology should be required at least a three year period of training superimposed upon his medical degree and a general internship of about one year's duration.

That the fundamental training in all that has been discussed in the preceding pages be more thoroughly encompassed, the better part of one school year should be devoted to special training in radiation and electrophysics with further studies in biology and pathology. The latter

should devote considerable time to gross pathology with further special attention to cellular structure in re to radio-sensitivity.

At this time more serious studying of roentgen anatomy inclusive of numerous borderline and normal variations should be undertaken.

At least one year should be spent in intensive courses in an institution especially devoted to this type of work. This period to be followed by at least another year as fellow or clinical assistant in an institution with a large and diversified service under strict full time supervision.

The satisfactory completion of such a period of instruction is deserving of certification. The legal matter is somewhat beyond the scope of this communication.

Only when physicians generally recognize their moral obligations and when roentgenology is placed upon the sound foundation as outlined in the preceding pages, will the best interests of the patient and humanity as a whole be conserved.

Association of American Medical Colleges

Time and place of holding annual meetings since 1890—date of called meeting which led to organization of the present Association in 1891—and name of presiding officer and school he represented.

DATE	PLACE	PRESIDENT	COLLEGE
1890 May 21	Nashville	Aaron Friedenwald	Maryland U.
1891 May 4	Washington	N. S. Davis	Chicago M. C.
1892 June 8	Detroit	N. S. Davis	Chicago M. C.
1893 June 7	Milwaukee	N. S. Davis	Chicago M. C.
1894 June 6	San Francisco	N. S. Davis	Chicago M. C.
1895 May 8	Baltimore	E. Fletcher Ingals	Rush.
1896 May 4	Atlanta	Wm. Osler	Johns Hopkins.
1897 May 31	Philadelphia	J. M. Bodine	Louisville U.
1898 June 6	Denver	Jas. W. Holland	Jefferson.
1899 June 5	Columbus	H. O. Walker	Detroit.
1900 June 4	Atlantic City	Parks Ritchie	Minnesota.
1901 June 3	St. Paul	Albert R. Baker	Cleveland P. & S.
1902 June 9	Saratoga Springs	Victor C. Vaughan	Michigan.
1903 May 4	New Orleans	Wm. L. Rodman	Jefferson.
1904 June 6	Atlantic City	Jas. R. Guthrie	Iowa.
1905 April 10	Chicago	Sam'l C. James	University M. C.
1906 March 19	Pittsburgh	Sam'l C. James	University M. C.
1907 May 6	Washington	Geo. M. Kober	Georgetown.
1908 Mar. 16-17	Cleveland	H. B. Ward	Nebraska.
1909 Mar. 15-16	New York	Eli H. Long	Buffalo.
1910 Mar. 21-22	Baltimore	Geo. H. Hoxie	Kansas.
1911 Mar. 3	Chicago	J. A. Witherspoon	Vanderbilt.
1912 Feb. 28	Chicago	Wm. P. Harlow	Colorado.
1913 Feb. 26	Chicago	Egbert Le Fevre	Univ. & Bellevue
1914 Feb. 25	Chicago	E. P. Lyon	St. Louis.
1915 Feb. 17	Chicago	Isadore Dyer	Tulane.
1916 Feb. 8	Chicago	C. R. Bardeen	Wisconsin.
1917 Feb. 6	Chicago	J. L. Heffron	Syracuse.
1918 Feb. 5	Chicago	W. S. Carter	Texas.
1919 Mar. 4	Chicago	W. J. Means	Ohio.
1920 Mar. 3	Chicago	Geo. Blumer	Yale.
1921 Mar. 8	Chicago	Wm. Pepper	Pennsylvania.
1922 Mar. 7	Chicago	Theo. Hough	Virginia.
1923 Mar. 2-3	Ann Arbor	C. P. Emerson	Indiana.
1924 Feb. 28, Mar. 1-2	Omaha	Irving S. Cutter	Nebraska.
1925 Mar. 5-7	Boston	Ray Lyman Wilbur	Stanford.
1925 Oct. 26-28	Charleston	Hugh Cabot	Michigan.
1926 Oct. 25-27	Cleveland	Hugh Cabot	Michigan.
1927 Oct. 24-26	Montreal	C. F. Martin	McGill.
1928 Oct. 29-31	Indianapolis	Walter L. Niles	Cornell.
1929 Nov. 7-9	New York	B. D. Myers	Indiana.
1930 Oct. 14-16	Denver	Wm. Darrach	Columbia.
1931 Nov. 30, Dec. 1-2	New Orleans	M. H. Rees	Colorado.
1932 Nov. 14-16	Philadelphia	Louis B. Wilson	Minnesota.

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*Revision of Medical Curriculum
by British Schools*

The present curriculum of the medical schools of Great Britain is not in consonance with the views held by some of the more representative schools and their faculties. This fact, and a series of articles which have appeared in the *Lancet* has prompted the University of London to call for the appointment of a committee which will consider the defects of the present curriculum and make suggestions for its reform. The members of the committee, which represents the University of London, Oxford and Cambridge Universities and the Royal Colleges of Physicians and Surgeons, are distinguished teachers. They include Sir Farquhar Buzzard, regius professor of medicine, University of Oxford; Dr. W. Langdon Brown, regius professor of medicine, University of Cambridge; Dr. A. M. H. Gray, dean of the Faculty of Medicine of London; Lord Dawson of Penn, president of the Royal College of Physicians; Sir Holburt Waring, president of the Royal College of Surgeons. Lord Dawson is chairman of the committee.

This committee is particularly interested in the curriculum of the medical schools of the United States, and has directed some of its inquiries to them—as well as to this Association. It is especially interested in the "overloading" of the curriculum and in establishing a closer correlation between the preclinical and the clinical subjects.

These two points have engaged the attention of the curriculum makers in this country to a great degree for a number of years, and already much progress has been made to overcome defects. Required hours have been lessened in number by

all schools, considerably by some, and correlation has been established by introducing clinical teaching in the first and second years and by extending the teaching in the fundamental sciences into the third and fourth years. The British committee has expressed special interest in these changes. The cooperation of the medical schools of the United States is sought.

* *

Problems of Medical Education

A series of articles was published recently by the *Lancet* of London entitled "What is the Matter with the Medical Curriculum?" In the opinion of the editor of the *Lancet* certain specific conclusions can be deduced from this series of articles: 1. The time of the student is over-occupied in routine, in book work and in examinations. 2. The association of medicine with other sciences, although growing more numerous and close, cannot be taken advantage of by students whose burden already presses so heavily. 3. There is a lack of continuity between the teaching received in the school and that received in the wards. 4. There is no agreed opinion as to the standard needed either in general or scientific training before professional courses are started. 5. There is no agreed opinion as to the equipment which examiners should expect from students presenting themselves for final tests.

Following this same course, the *Canadian Medical Association Journal* (Jan. 1933) announces the publication of a series of articles on medical education which will be prepared by recognized leaders in the profession, not only teachers but also practitioners, and the point of view of the medical student will also

be set forth. The first of these articles appears in this issue of that publication. It is written by Dr. Alexander Primrose, formerly dean of the Faculty of Medicine of the University of Toronto, and professor of surgery. An abstract of Dr. Primrose's paper appears elsewhere in this issue. This series of papers will be published for the purpose of eliciting discussion from interested persons to the end that a new curriculum will evolve therefrom.

The curriculum is one of the problems under consideration by the Committee on Educational Policies of this Association and will, no doubt, be made the subject of a report at the annual meeting to be held in Rochester and Minneapolis, Minnesota, later in the year.

Curriculum making has long been regarded by many as a favorite sport of medical educators, but it seems that it should be regarded more seriously when so many distinguished persons, institutions and organizations make it a matter of special investigation from which, it is hoped, much good will accrue.



German Medical Periodicals

The Medical Library Association is making great efforts to obtain a satisfactory solution of the present status in regard to the high, almost prohibitive, prices of German medical periodicals and is calling for the assistance of interested organizations and groups of individuals, as well as individuals in bringing about a change in conditions which will make it possible to secure these publications for every medical school library.

Careful study of the situation shows that at the present time, two-thirds of the current subscription budget of any medical library subscribing extensively to foreign periodicals is being expended for German periodicals issued principally by one firm or its subsidiaries, leaving one-third of a total appropriation for current journals for the scientific output of all

other countries, including the United States, and approximately half of the German publications. This is a fairly startling condition, and one which is naturally causing concern to libraries operating on curtailed budgets.

Direct appeals to the German publisher most concerned in this movement have been met with promises, but, so far, no reduction in price. The Medical Library Association therefore decided to appeal directly to the scientific groups in Germany themselves, with the hope that they would see the eventual impossibility of libraries continuing to carry their journals at such prices.

These journals have been put into the prohibitive luxury class for many workers and many institutions. The German journals are used by a smaller group of readers, due to the language difference; and therefore, a library which is paying five to eight times more for German periodicals than for those of any other country, would probably be forced to economize first on these most expensive periodicals. The majority of libraries are facing substantial cuts in their appropriations, and the indications are that there will be further cuts in the near future. It therefore seems certain that unless something is done to decrease the cost of these journals, cancellations of subscriptions are inevitable. Every scientific worker agrees that such a contingency would be very regrettable, therefore workers in the same field having the same interests and objectives should consider this problem which is at present a very real hardship to the research worker, and a stumbling block to the furtherance of progress in science and medicine as a whole.



The Foreign Medical Student

The following resolution was passed at a meeting of the Council of The New York Academy of Medicine, held December 28, 1932:

RESOLVED, that the Council of The New York Academy of Medicine learns with great satisfaction that the Council on Education and Hospitals of the American Medical Association, the Federation of State Medical Boards, the Association of American Medical Colleges and other organizations, have undertaken serious consideration of the problem of American students in foreign medical schools and desires to offer its cooperation in so far as it may to the end that a satisfactory solution be obtained.

♦ ♦

Resolutions Adopted in re Foreign Medical Students

An informal conference was held in Chicago, December 18, 1932, to consider the problem of 1500 American students now attending European (continental) medical schools. The following organizations were represented at this conference: Council on Medical Education of the American Medical Association; Association of American Medical Colleges; Federation of State Medical Boards; National Board of Medical Examiners; and New York State Board of Regents.

The following recommendations were adopted:

1. That no American student matriculating in a European medical school subsequent to the academic year 1932-33 will be admitted to any state medical licensing examination or to the examination of the National Board of Medical Examiners, who does not, before beginning such medical study, secure from a State Board of Medical Examiners or other competent state authority, a certificate endorsed by the Association of

American Medical Colleges or the Council on Medical Education and Hospitals of the American Medical Association, showing that he has met the premedical educational requirements prescribed by the aforementioned associations.

2. That no student, either American or European, matriculating in a European medical school subsequent to the academic year 1932-33 will be admitted to any state medical licensing examination, or to the examination of the National Board of Medical Examiners, who does not present satisfactory evidence of premedical education equivalent to the requirements of the Association of American Medical Colleges, and the Council on Medical Education and Hospitals of the American Medical Association, and graduation from a European medical school after a medical course of at least four academic years, and either

- (a) Obtain a license to practice medicine in the country in which the medical school from which he is graduated is located, or

- (b) Receive the degree of Bachelor or Doctor of Medicine after not less than one year's resident study in an American or Canadian medical school approved by the Federation of State Medical Boards of the United States, the Association of American Medical Colleges, and the Council on Medical Education and Hospitals of the American Medical Association.

It was further resolved that the Conference recommend to the Federation of State Medical Boards of the United States that the foregoing regulations be generally adopted by all boards of examiners in this country.

College News

University of Tennessee College of Medicine

Dr. A. Warde Allen, General Secretary of the International Faculty of Science (36 Gordon Square, London, W. C. 1), has just announced that at a meeting of the Council in London on January 3rd, 1933, Dr. A. Richard Bliss, Jr., Chief of the Division of Pharmacology, was elected National Secretary of the Faculty for the United States of America.

♦ ♦

University of Oregon Medical School

Dr. Clarence J. McCusker, professor and head of the department of obstetrics since 1921, died December 25, 1932.

The departments of obstetrics and gynecology have hitherto been separate. The dean announces the approval by the Chancellor of Higher Education in Oregon of the combination of the departments of obstetrics and gynecology into one and the appointment of Dr. Raymond E. Watkins, now professor of gynecology, to the position of professor and head of the department of obstetrics and gynecology.

♦ ♦

Long Island College of Medicine

Dr. James P. Warbasse inaugurated his discussion course on Medical Sociology in January. This is a compulsory course scheduled for the students in their second year and is designed to stimulate them to realize the relationship of the physician not only to the profession but to society, of which the profession is a part.

♦ ♦

West Virginia University School of Medicine

A portrait of the dean, John Nathan Simpson, was recently unveiled. It was

presented to the school by the class graduated in 1932 and other alumni of the School of Medicine. Dr. Simpson has been of the school for the past thirty years.

♦ ♦

Western Reserve University School of Medicine

The Executive Committee of the Board of Trustees of Western Reserve University recently formally accepted an anonymous gift of \$300,000 to found the Oliver H. Payne chair of surgery in the School of Medicine.

A coincident announcement, from the faculty of the School of Medicine, is that Dr. Carl H. Lenhart has been voted the first Oliver H. Payne professor to occupy the new chair. On December 6, Dr. Lenhart became professor of surgery and head of the department of surgery in the School of Medicine of Western Reserve University and director of surgery of the University Hospitals and at the Outpatient Department of Western Reserve University and the University Hospitals, upon recommendation of the faculty of the School of Medicine, succeeding Dr. Elliott C. Cutler.

♦ ♦

Boston University School of Medicine

Dr. Martin J. English, well known Boston physician, who was formerly associate professor of pediatrics, has been named full professor and head of the department of pediatrics, the position which was left vacant by the recent death of Dr. Orville R. Chadwell. Dr. English who was graduated from Harvard Medical School in 1907, is also pediatrician-in-chief at Boston City Hospital, St. Elizabeth's Hospital and St. Margaret's Hospital, Boston, and Whidden Memorial Hospital, Everett. Dr. Herman C. Pet-

terson has been named associate professor of pediatrics, and Dr. Moses J. Stone, assistant professor of diseases of the chest.

The two faculty members who are named professors emeriti are Dr. Solomon C. Fuller, professor emeritus of neurology, who came to the school in 1909 in the department of anatomy, and Dr. Conrad Smith, professor emeritus of laryngology, who joined the staff in 1912.

New Appointments—Instructors: John H. Cauley, clinical medicine; Jacob Kaminsky, tuberculosis; James H. Peers, pathology; Clifton T. Perkins, clinical psychiatry; Andrew Peters, tuberculosis; Morris Yorshis, clinical psychiatry. Assistants: Welman B. Christie, anatomy; Kenneth K. Day, anatomy; Theodore K. Keith, anatomy and surgery; Elihu Lewis, medicine; Thomas R. Mansfield, anatomy; Lee MacPhee, gastro-enterology; Ensio K. F. Ronka, surgery; Henry N. Rosenberg, medicine.

♦ ♦

University of Virginia Department of Medicine

Dr. J. F. Brock, Leverhulme Scholar at the Royal College of Physicians in London, Dr. Carl Ten Broeck, director of the Rockefeller Institute for Animal Diseases at Princeton, New Jersey, and Dr. James Baker, of the Thorndyke Memorial Laboratories in Boston, visited the medical school in December.

Dr. Dan Elkin, professor of surgery at Emory University, served as visiting professor of surgery during the week of January 9-14.

♦ ♦

Tulane University School of Medicine

It is announced that the Commonwealth Fund has granted \$25,000 to help meet the running expenses of the Hutchinson Memorial Clinic during the year. In this clinic patients are treated under the supervision of the staff in private rooms. Each senior student has a private office

in the clinic. The office is fully equipped for the examination of patients.

♦ ♦

University of Vermont School of Medicine

Dr. Thomas B. Parks of the department of biochemistry of the University is collaborating with the University of Cambridge, England, in a study of calcium and phosphorus absorption with respect to rickets and varying levels of vitamin D intake, the relation of parathormone to calcium and phosphorus absorption and the effect of heat on the nutritive value of certain proteins.

A group of medical students has been engaged in making a study of the correlation between the creatinine output and body weight and the effect of low and high protein diets on creatinine excretion, under the direction of Professor Embree R. Rose.

♦ ♦

Duke University School of Medicine

The winter quarter of the medical school began January 4, 1933, with forty-nine students in the first year class, sixty in the second year and fifty-five in the junior senior class. Four of the senior students completed their medical course December 23, 1932. Two seniors are taking their elective quarter at hospitals in London, England, and Dublin, Ireland, and several others are taking their elective work at other hospitals in this state.

♦ ♦

Woman's Medical College

Of the students now in college, 64.7 per cent hold bachelor's degrees.

Dr. Josephine C. Lawney, class of 1916, dean and professor of medicine in the Woman's Christian Medical College at Shanghai, China, addressed the faculty and student body on "Some Aspects of Medical Work in China."

On another occasion addresses were delivered by Dr. Stanley Harris, formerly professor of medicine at the American

University, Beirut, and Dr. Hitti, professor of ancient history at Princeton University. Dr. Saniyeh Moustafa Habboule, class of 1931, donated approximately \$800 to be the nucleus of a scholarship which would make medical study possible for some deserving student.

Dr. Madge Thurlow Macklin, of the department of anatomy of the University of Western Ontario, delivered an address on "The Relation of Genetics to Medicine."

* *

Johns Hopkins University School of Medicine

The twenty-first course of lectures on the Herter Foundation was delivered in January by Professor John J. R. Macleod, regius professor of physiology in the University of Aberdeen and visiting professor of physiology in Johns Hopkins University.

The course consisted of three lectures on carbohydrate metabolism.

* *

Harvard Medical School

William L. Richardson, who died October 20, bequeathed \$100,000 to Harvard University for the endowment of a professorship of obstetrics, the income to be used solely for the professor's salary. Dr. Richardson also provided \$40,000 for the establishment of the Jeffrey Richardson Fellowship, the income to be given annually to some deserving student desiring to continue his studies after graduation either in this country or abroad. His library, with the exception of his medical books, was also left to the university. The medical books were given to the Boston Medical Library. Dr. Richardson was dean of the school from 1893 to 1907.

* *

Marquette University School of Medicine

The new building of the school on North Fifteenth and West Clybourn Streets was dedicated January 4 with appropriate exercises.

Addresses were delivered by the president of the University, the mayor of Milwaukee, the governor of Wisconsin, Dr. William Gerry Morgan, dean of Georgetown University School of Medicine, Dr. Richard E. Scammon, dean of Medical Sciences University of Minnesota and the Archbishop of Milwaukee, the Rt. Rev. Samuel A. Stritch, D. D.

* *

Toronto University Faculty of Medicine

The Charles Mickle Fellowship has been awarded to Gaston Leon Ramon, Sc.D., director of the Pasteur Institute farm at Garches, France, in recognition of his work on diphtheria toxin, anatoxin of diphtheria and practical methods for community protection against infectious disease. The fellowship is awarded each year to the member of the medical profession who is considered by the faculty of medicine of the university to have contributed most to the advancement of medical art or science during the preceding ten years. It is the annual income from an endowment of \$25,000 bequeathed to the university by the late Dr. W. J. Mickle.

The George A. Peters prize, consisting of \$100 in cash and approximately \$100 in sterling silver, suitably engraved, has been awarded to Dr. William S. Keith (1927) for his work on transplantation of bone.

The Baptie Scholarship was awarded to K. J. R. Wightman. It is awarded to a second year student on his first year record, consideration being given to his financial needs. The value of the scholarship is \$100 and remission of \$75 in fees for one session.

Faculty Changes: Robert D. Defries, professor of hygiene and epidemiology; Donald T. Fraser, professor of hygiene and preventive medicine; A. M. Wynne, associate professor of biochemistry; Paul J. Moloney, associate professor in the department of chemistry with relation to

hygiene; Edmund P. Lewis, assistant professor of psychiatry; Henry A. Beatty, assistant professor of surgery; Neil E. McKinnon, assistant professor of hygiene and epidemiology; Jabez H. Elliott, professor of the history of medicine; Eric A. Linell, professor of neuropathology; Norman B. Taylor, professor of physiology; George Shanks, assistant professor of pathology; Arthur W. Ham, assistant professor of anatomy.

Dr. Fraser and Dr. Charles H. Best were appointed associate directors of Connaught Laboratories.

♦ ♦

Temple University School of Medicine

Dedication exercises for the new wing of the Temple University Hospital were held December 13, with President Chas. E. Beury presiding, and Sherman C. Kingsley, executive of the Welfare Federation as the principal speaker.

The addition, which is modern in every respect, contains 14 wards of 33 beds and 33 bassinets; a children's department of 64 beds; and two rooms each for bronchoscopic and eye cases of 8 and 10 beds, respectively.

Temple University Hospital, with this addition, now has a capacity of 497 beds and bassinets. Its facilities represent historically a merging of four former hospitals, Samaritan, Greatheart, Garretson and Roosevelt.

A trust fund of \$10,000 to establish awards for research in ophthalmology was left to Temple University in the will of Mrs. Julia Spencer Smith, Philadelphia. At the end of ten years the trustees may continue the trust or terminate it and apply the principal to laboratory work.

The Radiological Conference, which met in Philadelphia, January 27 and 28, held their Saturday morning meeting in the School of Medicine of Temple University. Papers were read by Dr. Chevalier Jackson, professor of broncho-

scopy and esophagoscopy, Dr. Temple Fay, professor of neurosurgery, Dr. John Royal Moore, professor of orthopedic surgery, Dr. Edward Weiss, clinical professor of medicine, Dr. Hugo Roesler, associate professor of radiology, Dr. Frank W. Konzelmann, associate professor of clinical pathology, Dr. George C. Henny, physicist, Dr. Barton R. Young and Wilbur Bailey, assistant radiologists in the School of Medicine of Temple University. The conference was entertained at luncheon in the Temple University Hospital after an inspection of the x-ray department.

Dr. Hans Zinsser, professor of bacteriology and immunology at Harvard University, lectured to the students of the School of Medicine on January 4.

Dr. W. Wayne Babcock, professor of surgery, Dr. Temple Fay, professor of neurosurgery and Dr. John A. Kolmer, professor of medicine, will give post-graduate lectures in conjunction with the course arranged for the Union County Medical Society, Elizabeth, New Jersey, conducted by the Medical Society of New Jersey in cooperation with Rutgers University.

Appointments: Bradford Green, instructor in obstetrics; Chester Reynolds, clinical assistant in obstetrics; Frank J. Noonan, clinical assistant in rhino-laryngology; Barton R. Young and Wilbur Bailey, assistants in radiology; S. Lawrence Woodhouse, Frank M. Dyson and Francis C. Hartung, clinical assistants in medicine; Louis Alexander Soloff, assistant in clinical pathology, and Gerald H. J. Pearson, lecturer in pediatrics.

♦ ♦

McGill University Faculty of Medicine

The elective courses held during the year were well attended by the students. Henceforth these courses will also be open to practitioners and assistants in the various departments of the medical

school. Lectures will be extracurricular and each department will offer short courses or demonstrations. It is the opinion of the faculty that the expansion of electives is the best means of furthering graduate study. It is hoped to extend the work so that the laboratory and clinical facilities of the school may be utilized for graduate instruction.

An anonymous donor has given \$25,000 for the study of cancer on the living subject. The clinic established some years ago in the department of obstetrics and gynecology will be extended to include a diagnostic and therapeutic department with an adequate follow-up service.

A new out-door clinic will be established as part of the general surgical out-door clinic.

Four thousand dollars has been received to be used for clinic-pathological studies on the reaction of cancer to radium.

♦ ♦

St. Louis University School of Medicine

A giant magnet, to be used for extracting particles of steel and iron from the eye, has been presented to the school as a memorial to the late Colonel E. G. Bingham, U. S. Army Medical Corps. The magnet has been placed in the ophthalmological suite of the outpatient department of the Firmin Desloges Hospital, a new unit of the medical school group.

♦ ♦

Vanderbilt University School of Medicine

Dr. Fred L. Soper, director of Yellow Fever Control work in South America, representing the Rockefeller Foundation, lectured to the class in preventive medicine and public health and to the Medical Faculty, January 19.

Dr. S. A. Roubakins, professor of pub-

lic hygiene in the University of Moscow, and Dr. H. Minch, statistician for the International Health Division of the Rockefeller Foundation, were recent visitors in the Department of Preventive Medicine and Public Health.

Dr. C. L. Scammon, director of the Division of Public Health of the Commonwealth Fund, was host to the students in the School of Medicine holding the Commonwealth Fund scholarships at a dinner, January 27. He also visited the school on that date.

♦ ♦

University of Cincinnati College of Medicine

Mrs. Christian R. Holmes has established the Christian R. Holmes senior and junior resident scholarships in the department of otolaryngology, the first named to carry an annual stipend of \$350, the second named, \$250. These scholarships will be of value not only in providing graduate training for young men in the specialty of otolaryngology, but at the same time in materially improving the work in this specialty in the Cincinnati General Hospital.

Dr. W. D. Haines, associate professor of clinical surgery, and for many years a member of the faculty, was recently given a complimentary dinner by his confreres in and outside of the college.

♦ ♦

University of Wisconsin

The sum of \$10,000 has been bequeathed to the university by the late Mrs. Mary C. Brittingham. The income is to be used exclusively for research in medicine.

Ovid Otto Meyer, assistant in medicine, Harvard University Medical School, Boston, has been appointed to succeed the late Dr. Ray Carrington Blankinship, associate professor of clinical medicine.

Personals

Byron B. Davis, professor of surgery in the College of Medicine of the University of Nebraska, was honored by a testimonial luncheon by the Omaha Chamber of Commerce for his services to the city of Omaha.

♦ ♦

John Mackenzie Brown, Los Angeles, has been appointed professor and head of the department of oto-rhino-laryngology in the University of Southern California School of Medicine.

♦ ♦

Joseph Warkany, Cincinnati, has been appointed assistant professor of pediatrics in the College of Medicine of the University of Cincinnati.

♦ ♦

Harvey J. Howard, professor of ophthalmology in Washington University School of Medicine, has resigned to enter private practice.

♦ ♦

George W. Corner, professor of anatomy, University of Rochester School of Medicine, delivered the third Harvey Lecture at the New York Academy of Medicine, December 15, on "The Nature of the Menstrual Cycle."

♦ ♦

Ewerts A. Graham, Bixby professor of surgery in Washington University School of Medicine, was awarded the gold research medal by the Southern Medical Association for his work on the diagnosis and inflammatory diseases of the gall-bladder and liver.

♦ ♦

Chauncey C. Maher, Chicago, has been appointed assistant professor of medicine in Northwestern University Medical School.

♦ ♦

Henry B. Ward, professor of zoology in the University of Illinois, former dean of the College of Medicine of the Uni-

versity of Nebraska, and former president of the Association of American Medical Colleges, was elected permanent secretary of the American Association for the Advancement of Science.

♦ ♦

Anton J. Carlson, professor of physiology in the University of Chicago, delivered the first Herbert Carter Swift Memorial lecture at Columbia University College of Physicians and Surgeons.

♦ ♦

Virgil E. Simpson, clinical professor of medicine, in the School of Medicine of the University of Louisville, and Wm. D. Haggard, clinical professor of surgery, in Vanderbilt University School of Medicine, conducted an Institute at the Community Hospital, Glasgow, Ky.

♦ ♦

Dr. John McLaughlin Forney, assistant clinical professor of obstetrics, School of Medicine, University of Alabama, was elected an honorary member of Alpha Epsilon Delta, honorary premedical fraternity, and gave an address at an open meeting January 27 in the lecture room, Commerce Building. His subject was "The Future of a Medical Career."

♦ ♦

Dr. Aldo Castellani, professor of tropical medicine and head of the department in Louisiana State University Medical Center, has been appointed director-in-chief of the Ross Institute and Hospital, London, succeeding the late Sir Ronald Ross. He will continue his connection with the Louisiana Medical School.

♦ ♦

Dr. Charles R. Stockard, professor of anatomy in Cornell University Medical School, was elected chairman of Section N (Medical Sciences) of the American Association for the Advancement of Science.

Abstracts of Current Literature

Undergraduate Teaching of Surgery

A questionnaire was sent out by the author covering matters dealing with the undergraduate education of students in departments of surgery. In this report is summarized the material received in response to the questionnaire. He says there can be no doubt but that the present tendency for the young graduates of a school to go out and practice surgery is dangerous for the community. In fact, it is so dangerous that it seems wise to find some method by which we can require of people who are to practice surgery a further definite period of training before the authorities will permit them to indulge in this special form of medical therapy. On the whole, the leading surgeons teaching surgery in the United States have indicated that in the teaching of surgery to undergraduates they would like to emphasize the principles of surgery, surgical pathology, the care of minor trauma and sepsis, and the matter of surgical diagnosis. These same men have indicated strongly that they do not think it is their job to teach operative surgery. This is a most important finding, because there are still state boards of registration in medicine who demand of students graduating from schools knowledge of major surgical procedures. The threat which this conveys sometimes reaches back into schools and some medical graduates think they know how to do surgical procedures. This is, of course, a dangerous state of mind to create in a young doctor, since immediately on graduation he may go out and begin the performance of dangerous operations for which he is entirely unfit. The author hopes that out of all this will come recommendations, perhaps to the schools, but also to the state licensing boards, making it clear that surgery is a dan-

gerous specialty, and requiring of individuals who would practice it extra years of education and special training before they are allowed to assume responsibility that may involve the lives of their fellow citizens.—E. C. CUTLER, *New England J. M.*, Dec. 29, 1932.

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What Is Wrong with the Medical Curriculum

Several months ago the *London Lancet* began publishing a series of articles on "What Is Wrong with the Medical Curriculum." The following abstracts are made from these articles.

1. The curriculum fails because it begins by conducting the student carefully along a road which he believes stretches indefinitely before him, and then at the end of the preclinical years jolts him suddenly on to another road without adequate warning or preparation. The remedy evidently is to see that he gets this warning and preparation, and that he has been taught, not only the essentials of scientific method, but also something of empiricism and tradition, so that when he meets these factors he will be able to discern them, to evaluate them correctly, and to estimate how far he may legitimately employ them in arriving at practical decisions.—BERNARD HART.

2. From the practitioner's point of view too much time is spent on the ancillary sciences, too little in clinical training. Some knowledge of these sciences is necessary, but a man may be an excellent practitioner and yet know few of the facts of chemistry and physics and have no really intimate knowledge even of anatomy and physiology. What is more, he may well practice more scientifically than another who has many of these facts at his finger tips. As knowledge extends, a case can be made out for teach-

ing the student more and more of the physical sciences because, at bottom, pathology and therapeutics can be expressed in their terms. The present curriculum appears to have set out with the ideal of giving every medical student a substantial knowledge of the physico-chemical basis of all biological processes, so far as it is known. This is bound to lead in practice to the acquisition of a smattering of ill-digested information covering an enormous field, and the shallowness of the student's knowledge will increase as its extent widens. Clinical teaching seems to have the same faults as that of the preliminary sciences. Book-learning is esteemed too highly; thought, skill, powers of observation and of reasoning too little. But all clinical knowledge, if it can be retained, is of direct value to the practitioner and it is here less easy to decide which provinces of study are fertile, which sterile; yet here also it must be right to look constantly to the end in view—presumably the making of a "good doctor"—to remember the rigid time limits imposed and the limited elasticity of the human memory, and to be scrupulously careful to abuse neither memory nor time. Moreover, the student himself should be taught to keep the end in view, and, as far as the curriculum permits, to direct his own studies appropriately. At present he is encouraged to study the preliminary sciences as though he intended to be a scientist, or, perhaps, rather a science master in a school, and the medical subjects as though it were certain that he intended to become a specialist and the only question to be decided was "in which subject?" Ought not the assumption from the very start to be that he is setting out to learn an art with scientific foundations which he intends to practice, and as soon as he reaches clinical subjects ought he not to be invited to assume that he is training for general practice (unless he is quite sure what else he means to do), and ought not the curriculum to be planned for

those who are so training? If this is sound reasoning, does it not follow that the clinical part of the curriculum should (1) train a man to examine his patients completely; (2) teach him enough of general pathology to reason out his diagnosis and to reason out also the clinical etiology of the condition; and (3) make him familiar with as many as possible of the common disorders, giving first place to those he is specially likely to meet and those which best illustrate general principles, and laying more stress on those which are preventable or amenable to treatment than on those which are not. The study of curiosities and rarities, unless they throw light on some general principle or some commoner condition, should be postponed until after qualifications.—
L. W. BATTEN.

3. Most teaching bodies have worked into their curriculum, at some stage convenient to the teachers of other subjects, a short course under the title hygiene or public health or preventive medicine, but until comparatively recently such courses were perfunctorily conceived and designed. The Society of Medical Officers of Health drafted a model syllabus which aims at recognizing the importance of confining specific teaching on public health to those aspects of it which will be useful to the nonspecialist practitioner and about which he is otherwise unlikely to be informed. At best such a syllabus can cover the ground only of a very much modified and abbreviated D.P.H. course. It includes a variety of necessarily disconnected items whose collective significance is not readily grasped, except by those who are nearing the end of their undergraduate period and contemplating the problems of actual practice. It should, therefore, be placed near the end of the curriculum. Again, when we contemplate the evolution of medical treatment and medical teaching, it is a matter of no surprise that instruction in "fevers," such as it is, is regarded purely as a part of systematic and clinical medicine, and

is, therefore, apt to be wrongly related to the study of public health which is so largely concerned with the control of communicable disease. But it is disconcerting to find that the lecturer or clinical teacher in fevers may have students in his class who have had little or no opportunity of learning about even the clinical manifestations and treatment of complications of the fevers about which he ought not to have to teach them. It is suggested, therefore, that the courses of instruction and the examinations in hygiene and fevers should be brought into association with one another and that they should together be given a place in the curriculum commensurate with their practical importance to the practitioner of medicine.—R. M. F. PICKEN.

4. This is a protest against the student's time-table being too much cut and dried when he first enters hospital with set classes and demonstrations which he must attend in order to be signed up. During the first three months of clinical study the student ought to be allowed to go anywhere and everywhere, and to have the opportunity to wander around the strange land of a hospital, and to follow his own interests, into whatever department they may lead. In this way he will take a peep at injury and disease from all points of view, and will learn to find his way about the living body much as he learned to find his way about the dead body in the dissecting room. He will also see death, and in the post-mortem room he can, even at this stage, roughly correlate the condition of the quick with the dead. During this formative period he should keep a note of what he sees, and should read up those particular things in the excellent textbooks which are available, rather than attempt from the beginning to learn his work by a course of systematic reading of so many pages a day. It would be a good thing if, in these early days, he could hear something of the history of his art, not formal teaching but enough

to whet his appetite and to make him familiar with great names. After that period has passed, the student may start his appointment and, so far as surgery is concerned, the post of dresser is an admirable education, and the period of dressership is none too long and need never be wasted. It is the nearest approach to an apprenticeship which is feasible. During this time the student is not only being taught, but is learning to teach himself, and in the daily contact with the sick he gets an intimate introduction to what must be his life's work. He becomes inoculated with the hospital spirit, becomes part of a humanitarian machine, and helps to keep ajar the ever open door. It is quite true that in after life he may be called on to wash out bladders—and, perhaps, many of them—every day, or to perform many other things that those of a certain temperament look on as entirely menial duties; but all the while he is learning the relationship between patient and attendant in a way which is most valuable. To learn to talk to patients; to handle patients; to be gentle and be commended for it, or to be rough and to hear disdainful remarks—this is valuable training, which should not be left out of a proper educational scheme. One factor in the medical curriculum is constantly overlooked, and that is the amount of learning that is imparted by the hospital nursing staff, especially the experienced sisters, during the time the student is holding appointments.—G. G. TURNER.

5. What is wanted is more individual and less class tuition, as well as a great (or one might say earlier) realization by the student of the benefits of individual observation of, and contact with, patients. He seems, as ever, to love spoon-feeding and will attend classes morning, noon and night. What he will not do—because of the call of so many fixed classes—is to spend time going round the wards with someone who will keep on grinding in the elements, day after day, until the

pupil can appreciate the cases as clinical entities and see how the various diagnostic "aids" are drawn together and guide the physician not only to correct diagnosis but to sound views on prognosis and individual treatment. This teaching is often best given by a junior, since so many of the honorary staff of hospitals specialize in one disease or group of diseases and tend to depart more and more from fundamentals in their teaching, which becomes ever more suited for the honors student or the post-graduate. The man who will do this individual teaching of two or three at the bedside is a *rara avis* nowadays. If only the student will demand individual teaching he will get it again, and the position will be saved. It is not easy for even a staff physician to indicate to the junior student clearly and intelligibly the steps by which his judgment is formed—the means differ so vastly from what they were a generation ago—but it is no use trying to give this sort of teaching to a student who has no knowledge of the fundamentals.—F. E. TYLECOTE.

6. Would it not be possible to ease the position by dividing students somewhere in the middle of their course into two classes of general and special candidates. They should all be brought up to a high standard, but under such a subdivision time would be found for the intensive work which the special candidates would seek, that time being occupied by the general candidates in acquiring a fuller knowledge of the fundamentals of general work. In the consideration of medical courses by university bodies there is at times a belittling of the importance of preparing men for general practice, the interest being taken mainly in the outstanding man who is likely to become a brilliant researcher. The answer usually supplied, when certain of the defects are brought forward, is that postgraduate education is devised to meet the situation, the special researcher, being brought to the same level in fundamen-

tals, qualifying therein, and proceeding later to develop his bent. This means an expenditure of time and money which must hamper some of the best men. The proposed subdivision would not imply a "pass" and an "honors" standard; it would mean that in the later stages of the curriculum those who did not intend to enter general practice would be better prepared for intensive or special work, while those who did intend to pursue general practice would have more time at their disposal, to be filled up by their clinical teachers, in which to acquire that familiarity with fundamentals the lack of which is now so rightly deplored.—F. E. TYLECOTE.

7. In teaching medicine to students who have just passed their examination in anatomy and physiology a mental gap is at once apparent. The present ways of teaching physiology do not seem to give it that impetus which will make it a part of clinical thought. There are gaps between Stannius' ligature and heart block, between the pyramidal tract and hemiplegia, between the sympathetic nervous system and referred pain, which rapidly become impassable unless they are bridged by reiteration of physiologic principles at the bedside. Under the present regime most of the knowledge gained so laboriously suffers disuse atrophy during the first year or two of clinical work. The foundation of clinical medicine is weakened and the fabric is afterwards unstable. The cry for closer cooperation between the physiologist and the physician is oft repeated. Friendships made in youth are the most enduring and certainly the friendship between physiology and medicine could be most firmly cemented at the beginning of the student's medical career while he is still studying anatomy and physiology. This end could in some measure be attained if, during the second year of the physiology and anatomy courses, one or two hours per week were devoted to clinical lectures and demonstrations by clinicians. In physiol-

ogy the syllabus for such a course should comprise subjects chosen to illustrate the effects of interference with normal physiologic processes, and clinical cases should be shown, when possible. In drawing up such a syllabus the physiologist and physician should work together, and sometimes physiologic and clinical demonstrations should be combined in the same lecture. Such a course will bring before the student the dependence of medicine on physiology while he is still studying physiology. The result will be that when he goes to hospital his mind will already be adjusted for the reception of medicine as a part of the physiology that he has already learned. This alteration in the curriculum would, it is hoped, be followed by a freer entry of the physiologist into the hospital; and the break in the continuity of physiologic and medical thought would to some extent be prevented.—L. COLLE.

8. A tuberculosis dispensary would be attached to every teaching hospital. The department should be in the charge either of a member of the hospital visiting staff specially interested in pulmonary disease, or of a tuberculosis officer of the highest qualifications, of ripe experience, and with gifts for teaching. Dispensary clerking should form part of the student's medical course. It would be an advantage if every teaching hospital provided one ward for the treatment of phthisis. It is in the interests of both patients and students that a short course of hospital observation should precede sanatorium treatment. Faulty selection of cases likely to benefit from sanatorium treatment is responsible for much disappointment to the sick and for a lamentable waste of public funds. The hospital ward would also enable students to be instructed in the principles of the various forms of collapse therapy, a subject of which most students and practitioners are ignorant. Full use should be made of the special chest hospitals. In the special hospitals every variety of heart and lung

disease can be studied and every modern means of investigation is at hand. The average medical student completes his medical course without ever having seen a sanatorium. A kind of staff tour of sanatoria occupying a week of the clerking period would be time well spent. The permanent staff of a sanatorium might well be supplemented by the appointment of house physicians under terms similar to those of the general hospitals. The term of office might be limited to three months. This would provide the recently qualified student with an introduction to ward work while awaiting his appointment as house surgeon or physician at a general hospital. He would learn much that would prove of the greatest value to him in subsequent practice; he would be brought into contact with preventive medicine of which the tuberculosis schemes must always form an essential part; and his presence at the sanatorium would serve as a constant and not wholly unneeded reminder to the permanent staff that tuberculosis is only one of the many ills that afflict mankind.—W. B. WOOD.

9. The ideal of the anatomist is to create, not doctors, but anatomists. The medical student is expected to transfer the dead leaves of Cunningham, one by one—from the first to the last—to the folds of his cerebral cortex, with complete disregard to the possibility that some of the leaves may hold more useful information than others. The teaching of anatomy requires revision in more ways than one. The most radical pruning would admittedly leave a still formidable catalogue of essentials. The memorization of this, however, would be made vastly more easy and more interesting if anatomy were regarded and taught as a study of the quick rather than the dead. The unravelling of the hardened abdominal and pelvic viscera of the shrunken cadaver yields a poor understanding of the shape and position of these organs during life.—F. B. BROWN

Parasitology in Medical Curriculum

The subject of human parasitology should receive attention early in the student's career. The proposal is not for an additional examination, but merely for the earlier introduction of human parasitology—that is, as a constituent part of the subject of zoology—without additional examination. Parasitology includes the study of the agents of many diseases which will play an important part in the postgraduate experience of every medical student, and the sooner, in his career as a student, he obtains an insight into the realities of their existence, the better for him as a medical practitioner and for the public which he will be called on to attend. No medical practitioner can avoid, at some time in his experience, having to deal with the diagnosis and treatment of disease due to one or other of the animal parasites. It has long been accepted that for anyone proposing to practice in the tropics and subtropics a very considerable knowledge of parasitology is essential. It is not yet sufficiently appreciated, however, that a large number of cases of serious disease produced by such animal parasites are constantly coming under the observation of medical practitioners in temperate climates. A knowledge of the morphology and life history of these parasitic organisms is thus essential for all medical men, and the elementary tuition in their structure and habits could usefully be imparted to the student quite early in his career. The essential methods required for the examination of the pathogenic parasites are not complicated, and the young medical student will find no difficulty in acquiring the technic of preparing films of blood and feces and the use of Leishman's stain and iodine. The parasites which are found in the blood, intestinal contents and tissues of the wild rat would serve as a very useful introduction to the pathogenic parasites of man.—D. B. BLACKLOCK, *Brit. M. J.*, June 13, 1932.

Medical Education

Physics, chemistry and biology are properly regarded as essential for training in medicine. An intensive training in all of these subjects would be of great value to a medical practitioner, because the principles inculcated by such studies are of daily application in the work of the physician or surgeon. Unfortunately, there is not time for an intensive and prolonged course. In my opinion, the problem should be squarely faced with due recognition of the object to be attained by training in these preliminary sciences. Surely, the object is to permit the students to solve at the bedside individual problems that require the application of the principles of physics, chemistry or biology. If that be so, then the training in these subjects should be restricted to whatever is necessary to attain its object. To expand the course further would no doubt result in valuable education for the man in medicine, but in the present crowded state of the curriculum of study it is impossible to permit it, no matter how desirable it might be.

Physiology permeates the entire environment of the medical practitioner's activities. Not a single patient comes under his purview who does not present more or less complex problems in physiology. In spite of this urge for a course of the most comprehensive character, it will be admitted that it is impossible to cover the entire subject in an undergraduate course consisting of didactic lectures and experimental laboratory work. The problem can only be solved by the head of the department who must be held responsible for utilizing the time allotted to him in the time-table to the greatest advantage, having as his objective the selection of such themes from the vast domain of physiologic lore as will be of the greatest value to the practitioner of medicine.

The course in anatomy must be comprehensive; it must include the entire human body. Here the student receives

intensive training in observation while experimental methods are held in abeyance. The dissecting room is his laboratory. His work must be thorough, painstaking and accurate. Here, as in other departments, the method of teaching the subject must be left to the individual teacher. There is no subject in which the individuality and resourcefulness of the teacher is more apparent in effective accomplishment. The subject should be made to excite the interest and enthusiasm of the student. Anatomy is a subject in which a student should not only know the details of anatomic structure; he should, likewise, understand the *raison d'être* of that structure. This can only be accomplished by constantly interpreting gross anatomy in terms of histology, embryology and comparative anatomy.

The student when he enters the years of clinical instruction has already laid a foundation consisting of a knowledge of the function and structure of the normal human body and of the biologic, physical and chemical laws that control its activities. Henceforth, he is to study the abnormal, the diseased individual, in the wards and outpatient department of the hospital.

Applied anatomy must be taught mainly in the department of surgery in all three years of clinical instruction. Preferably special courses in this subject should be provided in each clinical year. Applied physiology, similarly, should be mainly taught in the department of medicine. An attempt has been made in certain of our Canadian universities to meet requirements by appointing in the department of medicine certain clinicians, one trained specially in physiology, another as a biochemist, and so forth. The object is to emphasize and promote the application of these sciences to practical medicine. The clinical teachers are, without exception, men engaged in active practice. The introduction of the procedures of the scientific laboratory in the clinic has given rise to anxiety on

the part of some lest this should result in the sacrifice of intensive training in the direct examination of the patient exclusive of laboratory methods. The fear was that diagnosis would become too mechanical and less dependent on history taking, auscultation, percussion, and the careful and painstaking use of the faculty of direct observation. The situation demands careful thought.

Preventive medicine becomes of essential and increasing interest. In surveying the entire program as set forth in the medical curriculum and in attempting to criticize the course, having in view the ultimate goal of such undergraduate studies, one would suggest that there should be a greater degree of cooperation than at present exists. Cooperation should be evident among all the teachers of the course from the first to the final years. If non-essential features exist in any part of the curriculum of study they should be eliminated. The faculty as a whole should frankly examine and discuss the work of each department. By some such means each departmental head will be enabled to obtain a comprehensive view of the ideals to be secured in medical education with a more intelligent grasp of the requirements necessary to obtain efficiency as the ultimate goal is reached.—A. PRIMROSE, *Canadian M. A. J.*, January, 1933.

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Encouraging Young Men to Study Medicine

It is as much the purpose of a well poised medical school to keep some people out of the profession as it is its duty to prepare others for it. Many of the medical students are coming out of high school, taking two years of required pre-medical work, four years of medicine, and by the time they are twenty-three or twenty-four they are proudly wearing the title which an M. D. degree bestows. Most of them haven't the slightest idea what it is all about. A great many of

them have been sent to school simply because dad had the money and mother thought it was the thing to do. We believe that boys should not decide to study medicine until they have either finished a liberal arts degree in a university, or have been put through some of the courses in the school of hard knocks. Furthermore, we believe that they should make it without any pressure whatever being made in favor of medicine. There is but one legitimate reason for studying the art and science of medicine, and that is a burning desire to be of service to one's fellow-man. If this desire, like the ghost of Banquo, will not down; if it will not let the pilgrim sleep, or eat, or live in peace; if it bobs up here, there, and every place, in a dozen different guises, it means that he, provided he has health, brains and will, is one of the elect. Otherwise he had better take up something a lot less vital than this business of delivering babies, chiseling out mastoids, and diagnosing heart lesions.—EDITORIAL, *J. Indiana St. M. Assoc.*, February, 1933.

Changes in the Medical Curriculum in France

The question of changes in the medical curriculum was brought up last year, and a ministerial inquiry was instituted in all the faculties of medicine to ascertain their views. The matter is not entirely settled, but an important point has been decided. The examinations imposed on students have consisted heretofore of oral and practical tests. Henceforth, at the end of the first and also of the second year of study, all the students will turn in, without any name, but only an identifying character, a written paper, the relative merits of which will be determined by a committee of professors. The test will be eliminative; that is to say, in case of failure, the student will not be admitted to the oral tests but will be demoted to the class below. The

questions for these tests will be the same throughout France and will be forwarded, the day before the examination, in a communication from the minister, to the deans of all the faculties. The examination will consist of three questions and will be based, at the end of the first year, on anatomy, embryology and histology, and, at the end of the second year, on physiology, chemistry, physics and bacteriology. This measure, which has just been adopted by the superior council of public instruction, has been definitely decided on. This examination will make it possible for the university authorities to relieve the overcrowding of the faculties by eliminating in season the students incapable of pursuing their studies owing to their lack of training in the fundamental branches of medicine.—*J. A. M. A.*, Paris Letter, Apr. 23, 1932.

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Medical Schools and the Nation's Health

We hear much in these days of the great part which the practitioner is destined to play in the preventive medicine of the future, but we may ask whether we have given sufficient attention to the principles which are to guide our schools in the training of their pupils for the successful performance of this high service. The great hygienic movements of the nineteenth century, from which this new spirit draws its inspiration, owed little of their origin to the medical schools. It is a matter of commonplace that the emphasis in medical teaching is placed on the curative aspects, that is, the training is so organized as to prepare the doctor for the recognition and treatment of frank disease. His preliminary years are spent in the study of the medical sciences to provide him with that framework and that scientific attitude necessary for his later approach to the clinical subjects embraced within the medical art.

Where, in our schools organized for the study of disease, can we find a place

for the gospel of Health? Where, in a scheme leading from chemistry and anatomy and physiology through pathology and the postmortem room to clinical medicine and clinical surgery, can we break the chain to accommodate the new evangel? There is no more eloquent sign of the inability of the medical schools as at present organized to exercise creative leadership in these matters or even to accommodate the ideals of preventive hygiene than the nature of the reception which some of the new health movements have received at their hands.

It has long been evident that one essential step toward an alleviation of the dangers of childbirth is an improvement in the teaching of our medical students in midwifery. In the past this has been carried out by the schools in a manner sometimes described as scandalous. Despite the disquietude provoked by the spectacle of so many young and healthy women annually lost or hurt in the performance of a physiologic act, relatively few schools have yet found it possible to make provision for the bare teaching requirements. The chief reason advanced for the delay in providing adequate teaching in midwifery and child health is the already crowded character of the medical curriculum and the lack of time available even for such an urgent need. There is, of course, considerable truth in an objection based on the multiplication of the specialisms that have demanded inclusion in the teaching program. At the same time there is reason for the view that, apart from such considerations, the curriculum has acquired a rigidity that has deprived it of the capacity of responding to the needs of each new age.

As an example of irresponsiveness to

big preventive ideals, take the attitude of the schools to the subject of nutrition. Where, in our schools, is this expounded with the completeness and thoroughness which it demands? The extent of the influence wielded by nutrition in the mental and physical welfare of the community is impossible to overrate. Indeed, this should become a dominating concern of every medical school at the earliest possible moment. The professor of nutrition will inspire the rising generation of doctors with their larger duties to the public. Within his purview will come the child before and after birth, the observance of boyhood and girlhood, and the adult in his various activities of relaxation, industry and old age. Fresh air and sunshine and exercise will be his concern. He will be interested in the diets of different nations and their relative advantages. He will from his position of authority fulminate against the national peril inherent in present milk supplies.

A professor of public welfare should be an addition to professor of nutrition. His special study will be those other factors in the community which are concerned with the safeguarding of the health of the worker, housing, hours of labor, industrial fatigue, etc. It is obvious at the outset that curricula as at present organized cannot find room for the big new demands made on the teaching bodies. The time has arrived in the history of medical teaching when it is essential that the conceptions responsible for the creation and perpetuation of the present curriculum should be completely revised. The time is over-ripe for a recasting of methods of teaching to bring them into line with modern needs.—*JAN. YOUNG, Edinburgh M. J., January, 1918.*

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